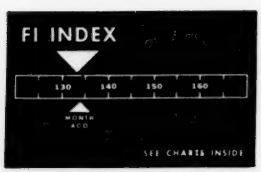
NATIONAL EDITION

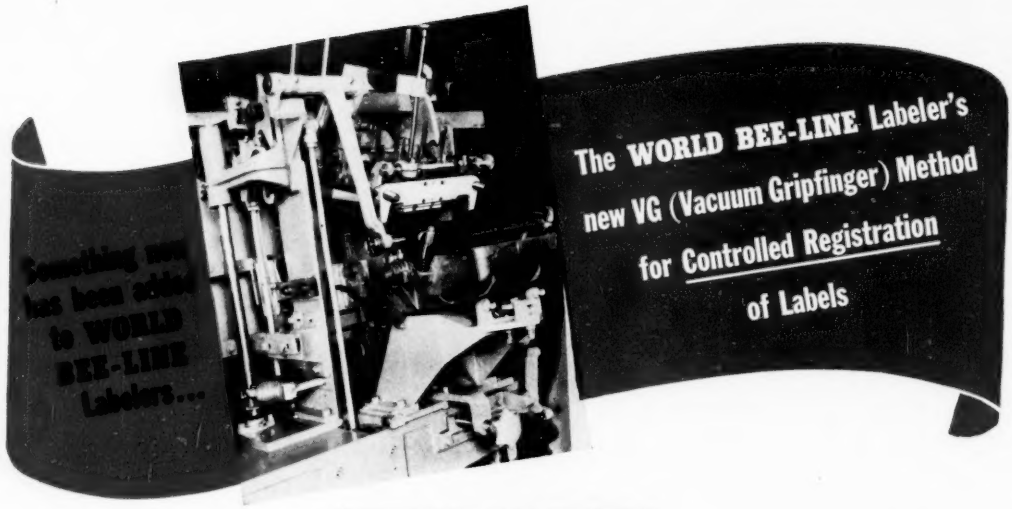
Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication

FI Award (left) goes to citrus canner for juice process involving revolutionary evaporator (right). Story inside.



JULY, 1949: Work simplified, Way to curtail shipping costs, Dextrose preserves colors, Closed eclair process, New peeler, Nutrition, Outlook


Something new has been added to WORLD BEE-LINE Labelers...
The WORLD BEE-LINE Labeler's new VG (Vacuum Gripfinger) Method for Controlled Registration of Labels

WHAT IT DOES

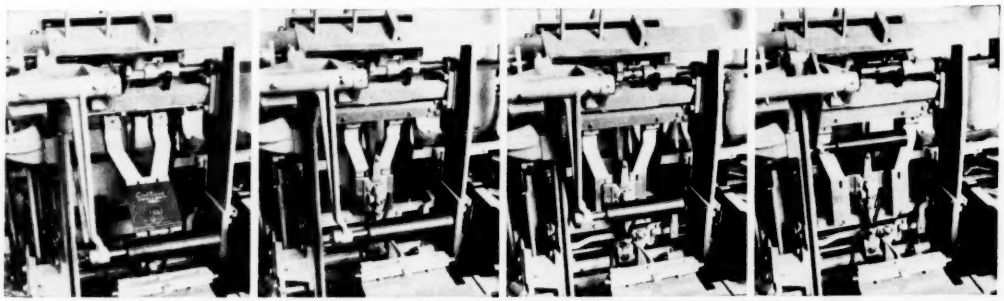
The new VG — Vacuum Gripfinger — method assures *controlled registration* of labels on containers, regardless of label size (even as small as a postage stamp) and regardless of adhesive adjustments or atmospheric variations. In sunken panels, on flat surfaces, body, neck or shoulder labels, medallions — any combination of labels, large or small, may be applied and precisely positioned simultaneously.

The new VG method provides a fine *even* application of adhesive over the *entire* label surface. There is no ungummed area, no possibility of marks or nicks on the sides of the labels whatever their shape. Clean, smooth, skin tight label application is a certainty.

Here is the *greatest* advance in quality labeling since the BEE-LINE sliding picker method was developed and patented.

Let us tell you how readily your Model 65 and Model 120 World BEE-LINE Labelers may be brought up-to-the-minute by the addition of the new Vacuum Gripfinger method.

HOW IT WORKS The view above shows the new Vacuum Gripfinger setup with the pickers in the act of picking a label from the label holder.



Here are the pickers on their way down to the container. In these close-ups of the operating sequence the gum box and label holder are removed so you can see what happens.

Here the Vacuum Gripfinger contacts the closed pickers, sandwiching the label. Note the bellows in the lower left hand corner. Its action produces the vacuum.

Here the pickers are opening, coating the adhesive over the entire label surface while vacuum holds the label securely and precisely for *controlled registration*.

Here the pickers have fully opened, allowing the Vacuum Gripfinger to move in and transfer the label to the container. 100% adhesive coverage is provided by the sliding motion of the pickers.

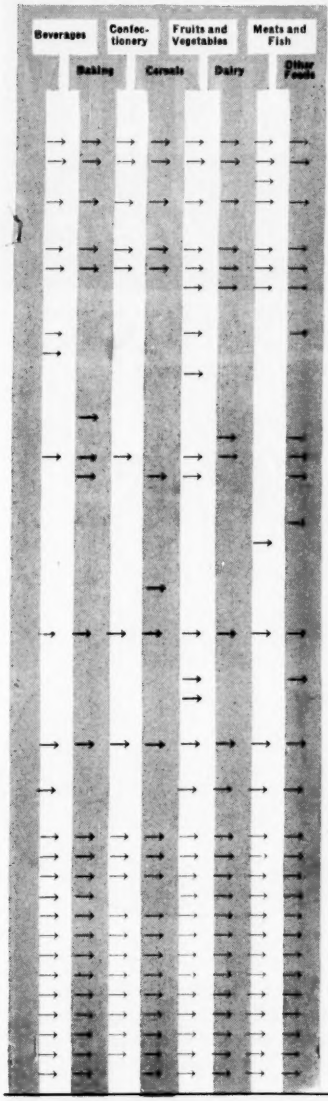
"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Many Purposes

WORCESTER, MASSACHUSETTS

INDUSTRY INDEX



Food Industries

JULY, 1949 • VOL. 21, NO. 7

SPECIAL FEATURES

How Progress Can Be Speeded in Food Processing.....F. K. Lawler 35
Enriched Food Products Are Credited for Better Health....R. M. Wilder 44
Assembly Line Makes "Mechanized" Sandwiches.....K. D. Kahn 62
Award for Progress..... 67

MANAGEMENT

Simplify Your Plant Tasks the Symbol Way.....Gerald Nadler 37
Dairy Industry Developments..... 78
Lockers Need Extra Services—Rents Not Enough.....Robert Cochran 82

QUALITY CONTROL

Dextrose Will Curb Color Changes.....R. F. Cohee and R. D. Walter 40
How to Hunt Down Beverage Spoilers.....Mooson Kwauk 58
New Method Gives Rapid Gage of Asparagus Color.....A. Kramer, *et al* 76

ENGINEERING

Continuous, Closed Line Assures Purity in Eclairs..Philip N. Simon, *et al* 42
Wheys Once Discarded Now Provide Useful Products....W. E. Stringer 54
Hawaiian Sugar Industry Converts to Bulk Handling.....E. B. Schmalz 64
Making Potato Flour, Meal and Feed at Low Cost..... 80

PACKAGING

What It Takes to Make Quality Penny Items at a Profit.....J. V. Ziemba 48
Tests Reveal How Storage Affects Canned Meat Flavor.B. W. Gardner, Jr. 51

RESEARCH

Milo Yields to Research.....C. C. Isely 53

DISTRIBUTION

Get Your Shipping Costs Down With Return Loads..... 60

EQUIPMENT

Lug Boxes Preserved With New Resin Coating.....FI Staff 71
New Type Lye-Peeler Does the Job Better...R. W. Kilburn, F. D. Hickey 73

CONVENTION REPORTS

Cereal Chemists ... Container Associates ... Confectioners..... 88

FI PICTURE-FLOWSHEET

Frozen Concentrated Citrus Juice..... 92

EVERY MONTH

Editorials – *Opinions and comments on current problems*.....35 and 85
Talk of the Industry *and* **Hors d'Oeuvres** – *On the lighter side*..... 36
Food Industries Index – *Production trends for 14 basic products*..... 99
New Packages and Products – *Innovations in foods and containers*..... 102
Food Industry News – *Roundup of recent developments*..... 111
Changes in Food Supplies – *Data on output, materials storage*..... 131
What Washington Thinks – *Interpretive comments from the Capital*..... 132
Men, Jobs and Companies – *A spotlight on firms and personalities*..... 135
Food Equipment News – *Better machines for food factories*..... 142
Catalogs and Bulletins – *Literature on equipment and supplies*..... 153
New Technology – *Technical advances reported in abstracts*..... 159
Books – *What's new for the food plant bookshelf*..... 173
Patents – *Machines and processes developed by inventors*..... 177

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FOOD INDUSTRIES is published monthly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), Founder; James H. McGraw, Jr., President; Curtis W. McGraw, Vice-President and Treasurer; Eugene Duffield, Executive Assistant for Publications; Nelson Bond, Director of Advertising; Joseph A. Gerardi, Secretary.

PRICE: 35¢ per copy. Subscription rates: U.S. and possessions, $3 for 1 yr., $4 for 2 yrs., $5 for 3 yrs. Canada, $4 for 1 yr., $6 for 2 yrs., $8 for 3 yrs, (payable in Canadian or U.S. funds). Pan American Countries, $5 for 1 yr., $8 for 2 yrs., $10 for 3 yrs. All other countries, $15 for 1 yr., $25 for 2 yrs., $30 for 3 yrs. Indicate position and company on subscription orders. Subscriptions invited only from food processing executives, engineers, technologists, operating supervisors, consultants and laboratories.

EDITORIAL AND EXECUTIVE OFFICES: 330 West 42nd St., New York 18, N. Y. Cable address: "McGraw-Hill, N. Y." Address correspondence regarding subscriptions to J. E. Blackburn, Jr., Director of Circulation.

PUBLICATION OFFICE: 99-120 N. Broadway, Albany 1, N. Y. Entered as second class matter Aug. 26, 1948, at Albany post office under Act of Mar. 3, 1879. Return postage guaranteed. Member A.B.P. and A.B.C. Indexed monthly in Industrial Arts Index. Copyright 1949, by McGraw-Hill Publishing Co., Inc. All rights reserved.

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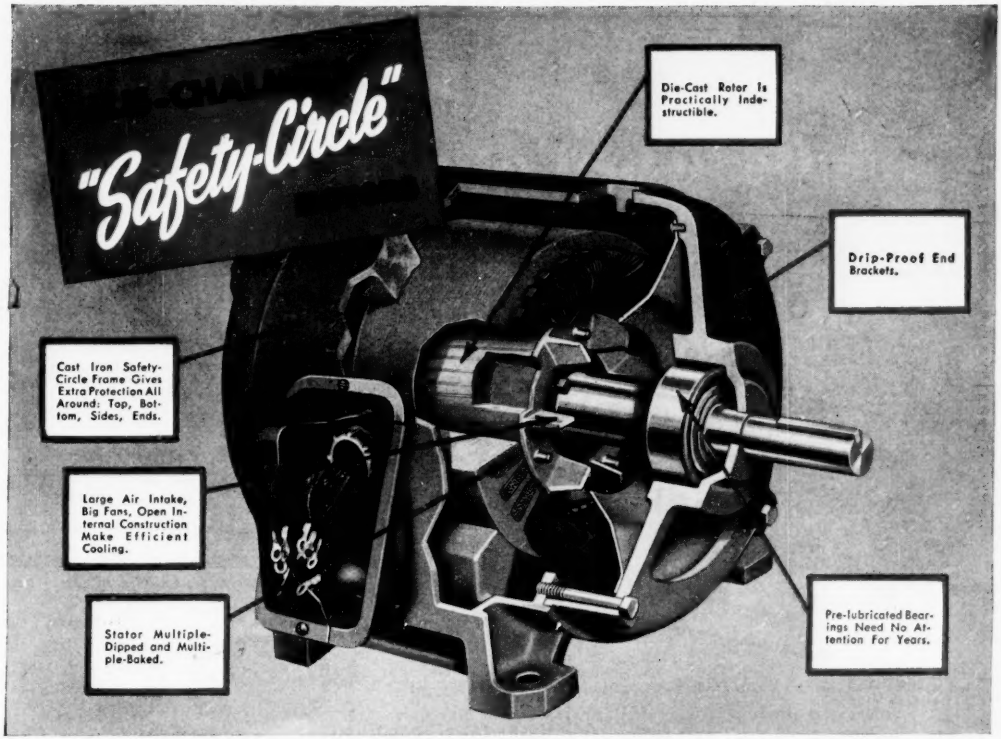
VIKING PUMP COMPANY
Cedar Falls, Iowa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transmission rate

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Specimens stored for 6 months
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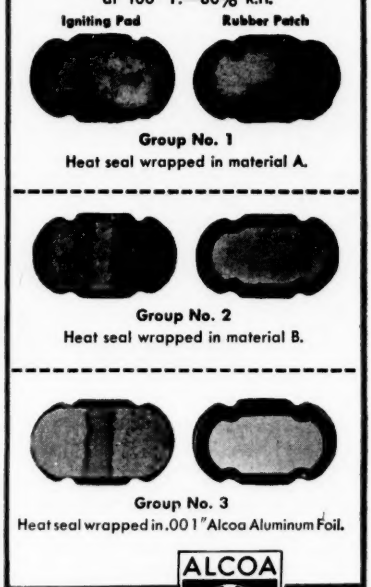

Group No. 1
Heat seal wrapped in material A.

Group No. 2
Heat seal wrapped in material B.

Group No. 3
Heat seal wrapped in .001" Alcoa Aluminum Foil.

Object of lab test: to compare Alcoa Foil Wrap for self-vulcanizing tire tube patches, with wraps of other materials now in use. Storage conditions—106° F. with 80% relative humidity, for six months.

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Further information on the results of Alcoa Packaging Laboratory tests is available. Write us concerning your packaging problems.

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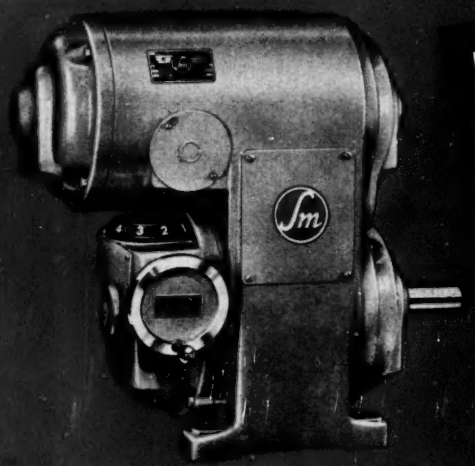

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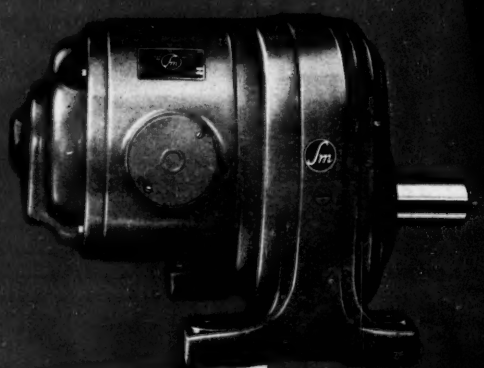

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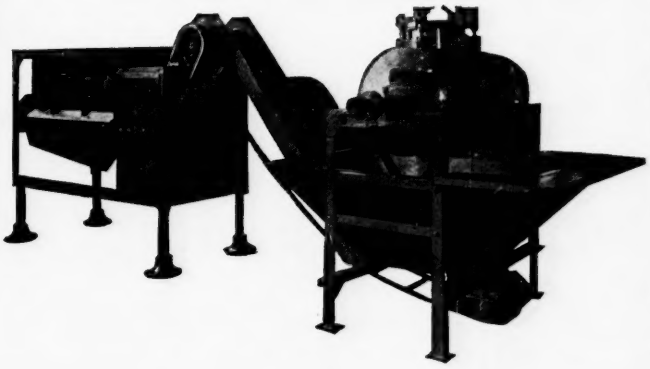
THE CHEAPEST WAY TO PEEL ROOT VEGETABLES—

PFAUDLER STEAM PEELER



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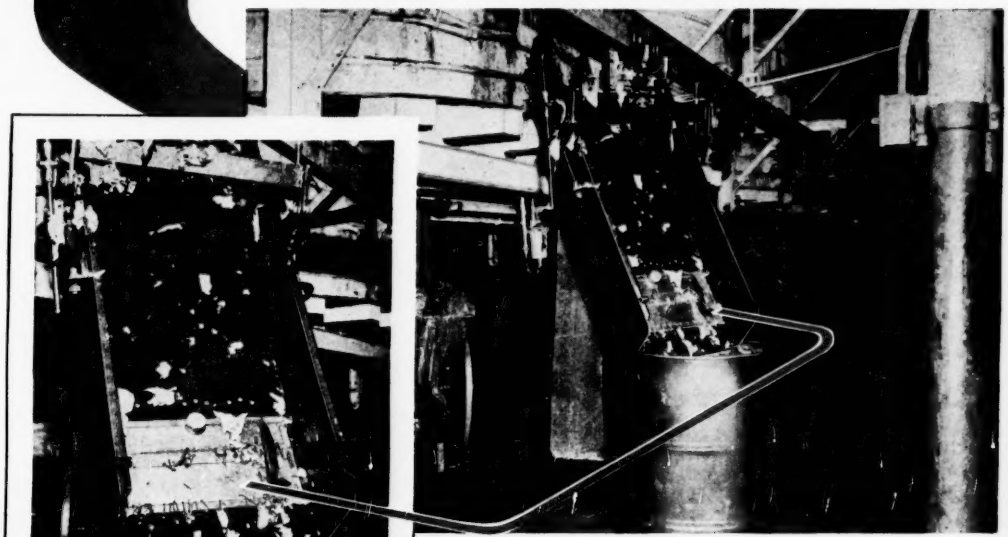

Eriez Non-Electric Permanent Magnets protect meat packer's products

TRAMP IRON cannot menace machines nor contaminate the products of the Wilson Packing Company. Their plants over the country utilize both Eriez Permanent Non-Electric Magnetic Pulleys and Plates to provide essential protection from tramp iron and assure purity of product. For example, United Chemical & Organic Products Division of Wilson & Company utilize Eriez Giant Magnets to remove tramp iron from the residue of their gelatine processing lines at their Calumet City, Illinois, plant. Machines used for subsequent processing of this residue are thereby protected. Notice the accumulation of tramp iron stopped by this unit. Engineered to fit the job of ferrous metal separation at hand, Eriez builds magnets in a variety of sizes and strength to meet each and every application. The intense penetrating magnetic power of Eriez Magnets prevents machinery damage, accidents to personnel, and assures purity of product throughout industry at a minimum of cost.

Wilsons' also use Eriez Pulleys to protect fat expellers from damage.

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Pioneer of PERMANENT Magnetic Separation

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The SCOTT NET WEIGHER

The original --and still the best!

The Scott Scale forms the basis of a family tree of net weighing and filling machines, both semi-automatic and fully automatic. The basic Scale alone (made in four different size models) is used for packaging free running items such as ground coffee, bean coffee, rice, barley, etc. To the Scale unit can be added one of our several models of Power Feeders, permitting the handling of a multitude of semi free flowing products such as Silex coffee, tea, nuts, candy, fine corn meal, lima beans, dog food, cut macaroni, cracker crumbs, etc. On a single dump unit, these products can be filled with closest accuracy at speeds up to 35/40 weighings per minute.

The semi-automatic Scale and Feeder unit becomes fully automatic in the Straight Line Weigher, and in our large Rotary Net Weighing Machines (the Models TU and TU-K), where single or duplex Scott Scale units form the basis of fast and accurate automatic weighing and filling.

Close to fifty years ago, the Scott Weigher was first manufactured by National Packaging Machinery Company, the original and only machine of its kind at that time, for continuous dump weighing and filling of coffee, tea, peas, beans and other food items. Today, under U. S. Automatic ownership, it is still made by the same company, by the same skilled craftsmen as in its early days. It is built to precision standards akin to watchmaking in their painstaking craftsmanship . . . the Scott has never sacrificed its fine workmanship to "corner cutting" production methods. To this we attribute the fact that the Scott today is the *fastest and most accurate single dump weigher in existence.*

Even now, we receive for overhauling Scott Weighers that were built 40 years ago, and which, when reconditioned and returned to the customers, operate like new.

The Scott Weigher has, of course, seen many changes with the years. It has been simplified and improved and its tripping mechanism is now solenoid actuated, which contribute to give it a smooth action with resulting speed and accuracy unequaled in the field.

Perhaps you'd like more information on what the Scott Weigher can do for your particular packaging needs. Won't you send us particulars on the types of products and containers you want to run, and the weight range and speed you require?

US

NET & GROSS WEIGHING ★ PACKAGE FORMING & FILLING ★ CARTON SEALING, LINING, WRAPPING ★ BOX MAKING

AUTOMATIC BOX MACHINERY CO., INC.

Owning and Operating NATIONAL PACKAGING MACHINERY CO. ★ CARTONING MACHINERY CORP.

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Branch Offices: New York ★ Cleveland ★ Chicago ★ Los Angeles (Krugh Equipment & Supply Co.)

Easy as fixing a faucet

THE GRINNELL-SAUNDERS DIAPHRAGM VALVE has only one part that normally wears and needs replacement . . . the diaphragm. Depending on the type of service, it may last for years or only months. It can be replaced in just a few minutes. The valve body doesn't have to be removed from the pipe line . . . only the bonnet. The new diaphragm is attached to the bonnet which is then bolted back onto the valve body . . . and the valve is restored to service. That's all the maintenance a Grinnell-Saunders Diaphragm Valve normally needs. No packing glands to demand frequent attention. No refacing or reseating required, because there are no metal-to-metal seats to become damaged or wire drawn.

SIMPLE, POSITIVE OPERATION . . . Flexible diaphragm opens wide for streamlined flow, pinches tight for positive closure even when grit, scale or other solid matter is trapped on the weir.

NO CLOGGING . . . MINIMUM RESISTANCE TO FLOW . . . Smooth, streamlined fluid passage without pockets prevents accumulation of sludge and reduces friction resistance to a minimum.

NO CORROSION . . . NO CONTAMINATION . . . NO LEAKS . . . The working parts of the valve are completely isolated from the fluid by the diaphragm. Diaphragm materials, body materials and body linings are available to suit service requirements.

Available in various combinations of valve bodies and operating mechanisms. Write for catalog.

89 YEARS PIPING

GRINNELL

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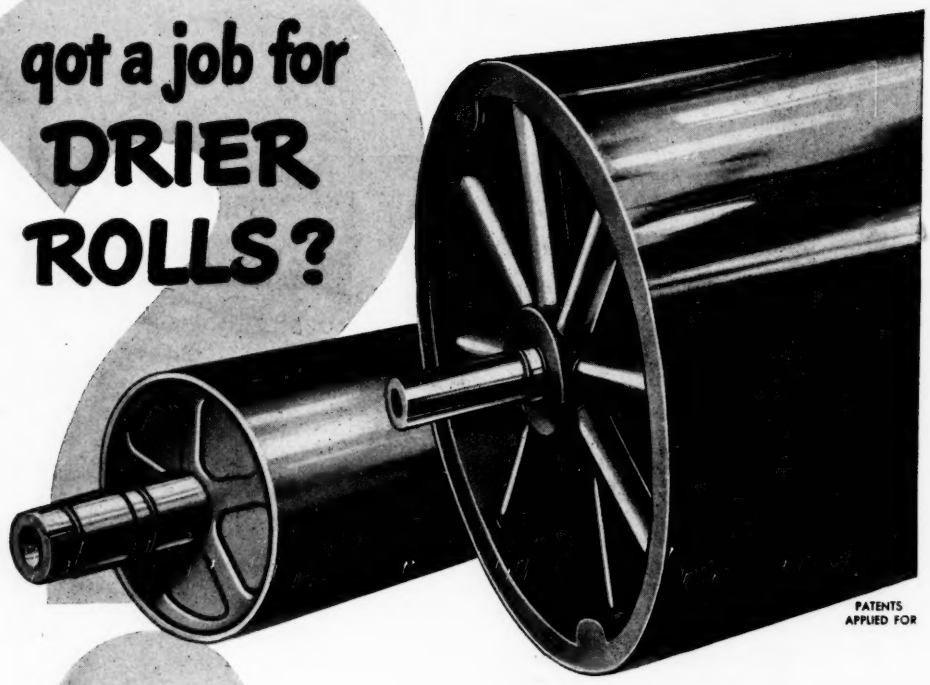
got a job for DRIER ROLLS?



Here's how to do it faster

Lukenweld Jacketed Steel Rolls have helped dozens of companies speed up operations—heating or chilling materials to dry, crystallize, harden or otherwise condition them. Records covering hundreds of these rolls show production increases as high as 41% without increasing steam pressures. When pressures are elevated, production increases to over 60% can be achieved.

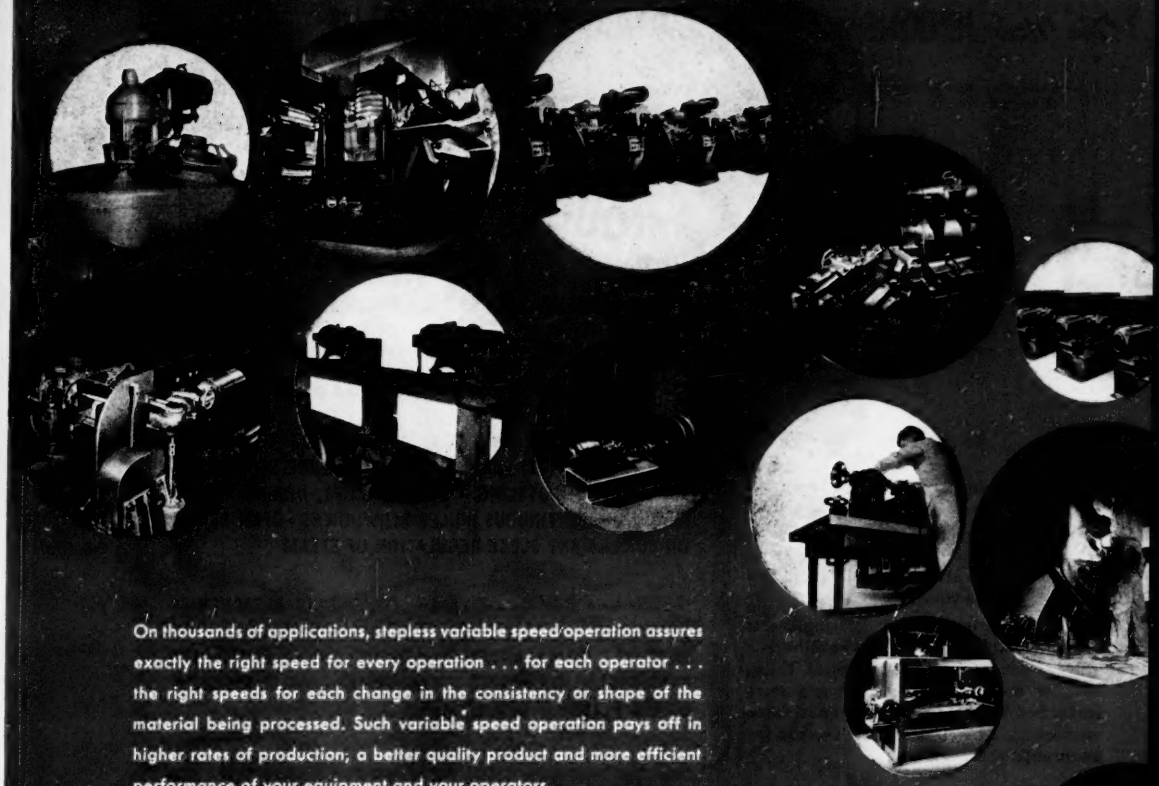
The jacketed, steel plate construction of Lukenweld Rolls does the trick. Steam, circulating through their narrow passages, moves at high speed; condensation is removed positively and continuously. Heat (or cold, if it's a chilling job) is transferred rapidly and uniformly through the comparatively thin but strong steel walls. Lukenweld Jacketed Steel Drier Rolls can be safely operated at pressures of 350 psi and higher.

Whether your job calls for rolls alone, an addition to present equipment or a complete new machine, Lukenweld engineers are prepared to engineer and build it for you. For such help, or for Bulletin 358 on Lukenweld Rolls, write Lukenweld, Division of Lukens Steel Company, 401 Lukens Building, Coatesville, Pennsylvania.

We'll lend you "LUKENWELD", a 16mm motion picture with sound, highlighting our methods, facilities and products. Running time: 20 minutes. Write for booking date.

LUKENS
LUKENWELD DIVISION

DESIGNERS, ENGINEERS AND MANUFACTURERS OF MACHINERY



On thousands of applications, stepless variable speed operation assures exactly the right speed for every operation . . . for each operator . . . the right speeds for each change in the consistency or shape of the material being processed. Such variable speed operation pays off in higher rates of production, a better quality product and more efficient performance of your equipment and your operators.

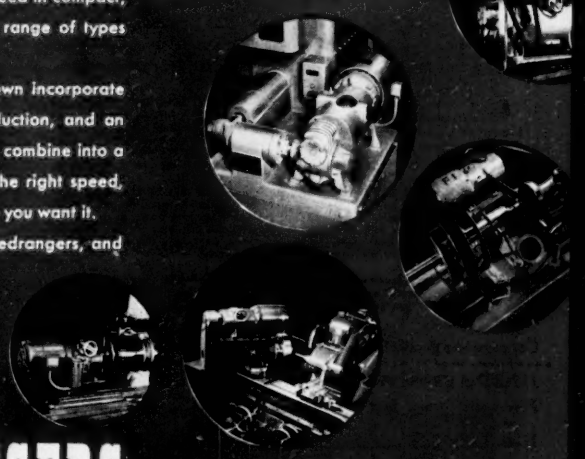
[illegible] doesn't cost

IT PAYS

Master Speedrangers provide this infinitely variable speed in compact, all-metal, mechanical variable speed units in a wide range of types and sizes up to 5 horsepower.

See how the Speedrangers on the applications shown incorporate an electric motor, a variable speed unit, a gear reduction, and an electric brake . . . all standard Master units that easily combine into a compact, integral power drive. This provides exactly the right speed, the right features, in a unit that you can use right where you want it.

Write for Data 7525, a new 24-page book on Speedrangers, and see what a real job they can do for you.



MASTER SPEEDRANGERS

THE MASTER ELECTRIC COMPANY · DAYTON 1, OHIO

The New **JENKINS** PLUG TYPE **ARMOR SEAT VALVE**

TAMES THE TOUGHEST VALVE SERVICES IN INDUSTRY

SETTING RECORDS FOR LONG LIFE AND LOW MAINTENANCE

For Severe Services like... **PRESSURE REGULATION STEAM CONTROL • BY-PASS LINES • TEMPERATURE REGULATION APPARATUS THROTTLING • BLEEDS, DRIPS, DRAINS • SOOT BLOWERS • CONTINUOUS BOILER BLOWDOWNS • OPEN BLOWS ON BOILERS • ANY CLOSE REGULATION OF STEAM**

In Many Industries like... **DYE WORKS • BLEACHERIES BREWERIES • OIL REFINERIES • CREOSOTING PLANTS • PACKING HOUSES • MILK PLANTS • PLASTIC MOLDING PLANTS • HAT FACTORIES • GAS WORKS • TANNERIES • SUGAR REFINERS BOILER PLANTS • RUBBER MILLS**

Do YOUR piping systems include valve-killing services that build up excessive maintenance and replacement costs? If so, the new Jenkins Fig. 976-A Plug Type Bronze Globe Valve will produce important savings for you.

Install it where "wire drawing", due to close control of steam, knocks out other valves quickly—where entrapped chips, rust, or scale score the seats and start leaks. See how it defeats the worst valve enemies . . . how it sets new records for endurance and economy.

HERE'S WHY

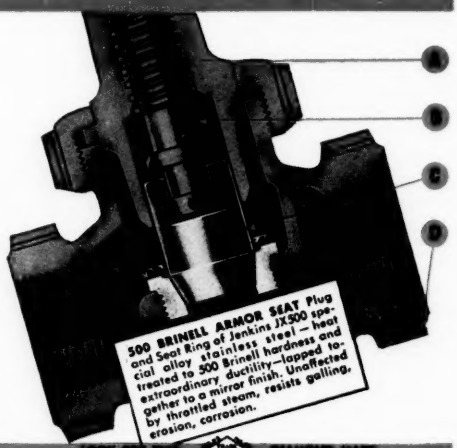
The stout "heart" of the Fig. 976-A is the stainless steel plug and seat ring, *hard enough* (500 Brinell) to smash steel pipe chips without scoring, yet *tough enough* to take a nine ton load without cracking. Other features are . . .

A **MORE THREADS, LESS WEAR**—Additional threads in bonnet and on spindle assure full thread engagement (open or closed), less load, less wear per thread.

B **NEW "TUFFARD" SPINDLE**—Aluminum bronze (tensile strength exceeds 65,000 lbs.)—tough to take stresses, yet hard for long wear. Bigger in diameter, with more strong threads.

C **NEW SLIP-ON, STAY-ON PLUG**—Simple design with T-slot for engaging spindle head is stronger, trouble-free, and permits free flow. Mirror-finished bevel assures perfect mating with seat ring.

D **NEW STURDY LUGS**—Flat-faced, V-shaped lugs on union bonnet ring and body ends, permit firm fit and grip of open end, pipe or monkey wrench—withstand repeated disassembly.



500 BRINELL ARMOR SEAT Plug and Seat Ring of Jenkins JX500 special alloy stainless steel—heat treated to 500 Brinell hardness and extraordinary ductility—lapped together to a mirror finish. Unaffected by throttled steam, resists galling, erosion, corrosion.

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros. Ltd., Montreal.

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WHITE-TAILED DEER* *

CANADIAN PORCUPINE*

PAPERS For The FOOD INDUSTRY

KVP

Packaging procedure in any food plant calls for special protection papers.

KVP papermakers have long specialized in the right kind of protection for nearly all products of the food industry.

KVP artists and printers are masters at adding beauty and sales appeal.

We welcome a chance to pool our respective "know-hows" for the best possible packaging of your products.

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DAIRY
Butter - Cream - Cheese
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FISH - FRUIT - FROZEN FOODS
POULTRY - SHORTENING
VEGETABLE

*Slow of foot, dim of wit, the common Canadian porcupine (Erethizon dorsatus) survives because of the panoply of protective spears with which Nature has endowed him.

**The beauty and grace of the American white-tailed deer (Odocoileus virginianus) makes him one of the world's most lovely creatures. Both deer and porcupines are common in KVP's Canadian timberlands.

Kalamazoo Vegetable Parchment Company

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IN CANADA: THE KVP COMPANY LIMITED, ESPANOLA, ONTARIO
APPLEFORD PAPER PRODUCTS LIMITED, HAMILTON, ONTARIO - MONTREAL, QUEBEC

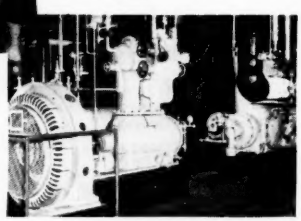
in frozen-juice processing, too, G-E drives help "keep it continuous"

Direct-mounted on a refrigerator compressor at Vacuum Foods is a 100-hp G-E synchronous motor for maintaining exact speeds and correcting power factor. Its control panel (above) is typical of many G-E controls in the plant that help keep operations flowing smoothly.

For reliable performance and close quality control, G-E equipment is used practically throughout at Vacuum Foods

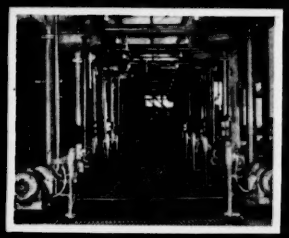
Here's an example of a food plant that decided to "go continuous" right from the start. It's the Vacuum Foods Corporation plant at Plymouth, Florida, processing Minute Maid frozen orange-juice concentrate. As many others have done, it turned to General Electric to supply and co-ordinate practically all its electric equipment. Now this plant, too, knows how G-E motors and control can help keep a processing line running at top capacity, contribute to uniform product quality.

If *you* are planning on "going continuous" to reduce handling costs in your food plant operations, it will pay you to check first with a G-E sales engineer. Backed by a staff of engineers specializing in the food industries, he can help you obtain the many advantages of continuous processing methods at lowest cost—by efficient application of G-E motors and control. Call him at your nearest G-E office. *Apparatus Dept., General Electric Company.*

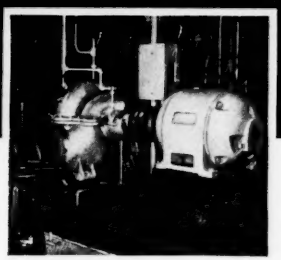


Food Plant Drives

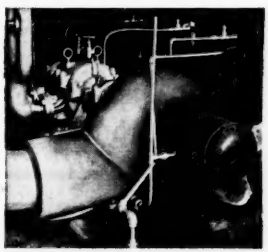
GENERAL ELECTRIC



Pumps shown here that circulate juice at high speed through a vacuum evaporation system are driven by a group of 2-hp G-E totally enclosed fan-cooled motors. In cast iron construction that resists corrosion, and protected against dripping or splashing liquids, these sturdy motors require only a minimum of maintenance.



With 3500 gallons of water per minute needed, pump motors must be especially dependable. This 75-hp G-E Tri-Clad open (dripproof) motor, one of many throughout the Vacuum Foods plant, provides a high degree of service continuity in driving pumps for the water circulating system.



Here, a 40-hp G-E mechanical drive turbine drives one of the plant's boiler feedwater pumps. For food plants using process steam, G-E turbines provide a reliable, low-cost machine drive while also acting as a reducing valve to furnish low-pressure process steam.

G-E Battery Chargers for electric trucks

KEEP EM ROLLING

At the Vacuum Foods Corporation plant in Plymouth, Florida, frozen orange-juice concentrate is moved quickly and continuously by means of electric battery trucks. To help insure the uninterrupted service needed for top-capacity production, the plant makes extensive use of its G-E copper-oxide battery-charging equipment. Among its many advantages that have "sold" Vacuum Foods are these:

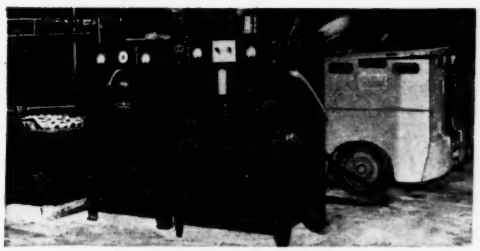
Fully automatic. After operator sets a control, the charger takes over, delivers the charge, and then shuts itself off.

Easy to use. Operator just plugs in the cable leads, and the charger does the rest. No special equipment is needed for installation.

On-the-spot charging. Units can be easily moved, or placed strategically to be ready and handy when needed. No time or manpower is wasted running trucks to and from a central charging station.

Long life. The G-E copper-oxide stacks—heart of the charger—have exceedingly long and dependable service life. Nothing moves except a fan, so there's little to wear out and be replaced.

General Electric's complete line of battery-charging equipment, including motor-generator types, is available through your truck dealer or distributor. Bulletin GEA-5249 gives complete information.



The low cost of G-E copper-oxide battery chargers, like these two at Vacuum Foods, is quickly amortized by savings in time, faster movement of materials, and more efficient use of manpower.

See "Materials Handling"! How electric trucks and other modern materials handling equipment boost productivity is shown in this G-E sound and color motion picture. Your nearest G-E office will gladly arrange for a showing.

More Power to America

WANT MORE DATA?

General Electric Company, Section 652-2
Apparatus Department, Schenectady 5, N. Y.

Please send me the following bulletins:

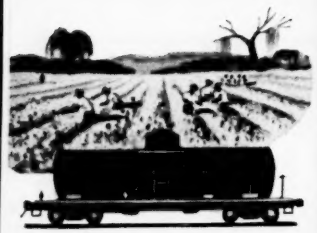
☐ **GEA-3580**—Tri-Clad induction motors
☐ **GEA-4322**—Electric equipment for the food industry
☐ **GEA-5249**—Copper-oxide battery chargers

Name.....

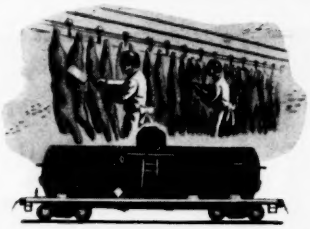
Company.....

Street.....

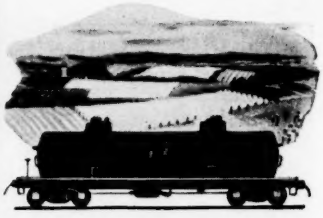
City.....**State**.....



COTTONSEED OIL

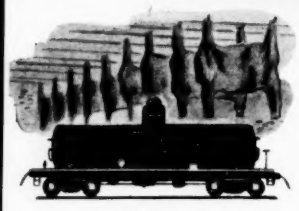


LARD



LINSEED OIL

for bulk liquid shippers
GATX Tank Cars
offer safe, economical transportation



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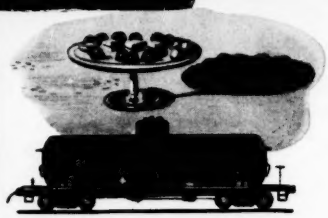
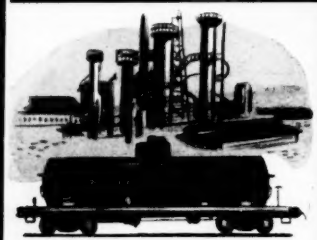
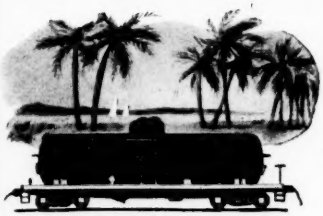


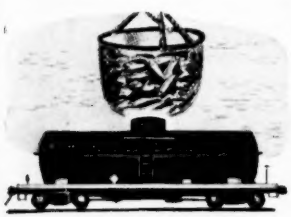
CORN SYRUP UNMIXED



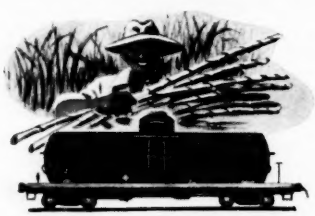
CORN OIL



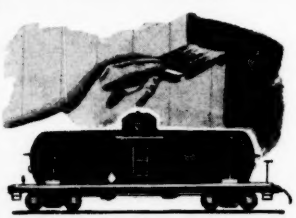
COCONUT OIL



FISH OIL



MOLASSES



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Our original laboratory research has produced a new and outstanding imitation raspberry flavor. It is of highest concentration and adapted for general purpose work.

Samples on request.

Our flavor catalogue is now available.

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Best for Tumbler Sealing . . .

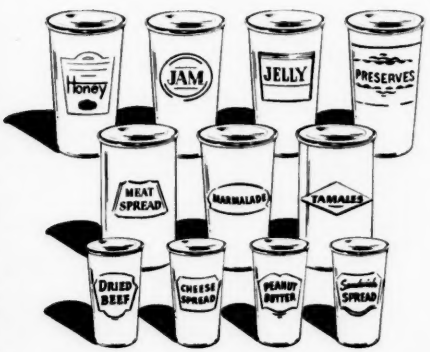
ANCHORVAC* T CAPS

FOOD products packed in thin blown or thin pressed tumblers having straight, flared, wide flared or bead finish sides can best be protected by *Anchorvac* T Caps.

That's because these caps provide a positive, tamper-proof, permanently effective seal whether used in vacuum sealing, hot packing, sterilizing or processing. The seal is mechanically formed well below top edge of container by compressing skirt of cap so sealing gasket is forced into a tight even contact with the container finish.

If you pack, or contemplate packing, in thin blown or thin pressed tumblers, let us discuss with you the advantages to be gained with *Anchorvac* T Caps and *Anchor* sealing equipment on your packaging lines.

* Trade-Mark



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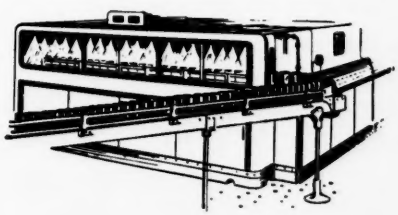
It's shock-resistant Anchorglass*

STRONG, tough *Anchorglass* Containers take in stride the thermal shock encountered in normal heating and cooling operations.

Their high level, dependable performance is due to the extreme care exercised in their manufacture. Even distribution of glass, accurate temperature control in annealing, exacting quality control through laboratory tests and regular inspections make and keep *Anchorglass* Containers uniform and strong . . . result in outstanding performance and efficiency all along packers' production lines.

Anchorglass Containers are available in all standard styles, capacities and finishes, in crystal, amber and emerald green glass. May we submit samples and prices and discuss with you the many merchandising as well as production advantages of packing your products in *Anchorglass* Containers?

*Reg. U. S. Pat. Off.



ANCHOR HOCKING
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WITH PEPSI-COLA WORKERS

REEVES ARMY TWILL

DELIVERS THE GOODS

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Take a tip from organizations that are smart about their business—boost your employee morale . . . build Company prestige . . . and effect greater savings with smarter looking, longer wearing uniforms of Reeves Army Twill.

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It's a Reeves Fabric

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the end of horse and buggy days

for stainless sheet and strip

Automobiles were once designed as horseless carriages—even to the dashboard socket for a needless whip. Stainless steel production, too, once struggled thru horse and buggy thinking. More power, heavier rolls, more care in surface finish—and stainless sheet and strip came forth a step-child of carbon steel methods. Today's modern strip mills have changed this, giving stainless production new concepts of quality.

CRUCIBLE, one of the pioneers in stainless steel, has gone still further. Now, *for the first time*, hot and cold rolled stainless steel is made a *specialty product*, by specialty production methods, in a mill built specifically for this purpose—in widths from ½" to 50" inclusive, and in all gauges, grades and finishes.

This is more than merely another source of supply. For, with this new mill at the Midland Works and the Trent Tube Co. joining the organization, CRUCIBLE can now supply you with *every* form of stainless. And, in sheets, plates, strip, bars, tubing, forgings, wire and castings, you can rightly expect the best that modern facilities and generations of *specialty product* leadership can provide.

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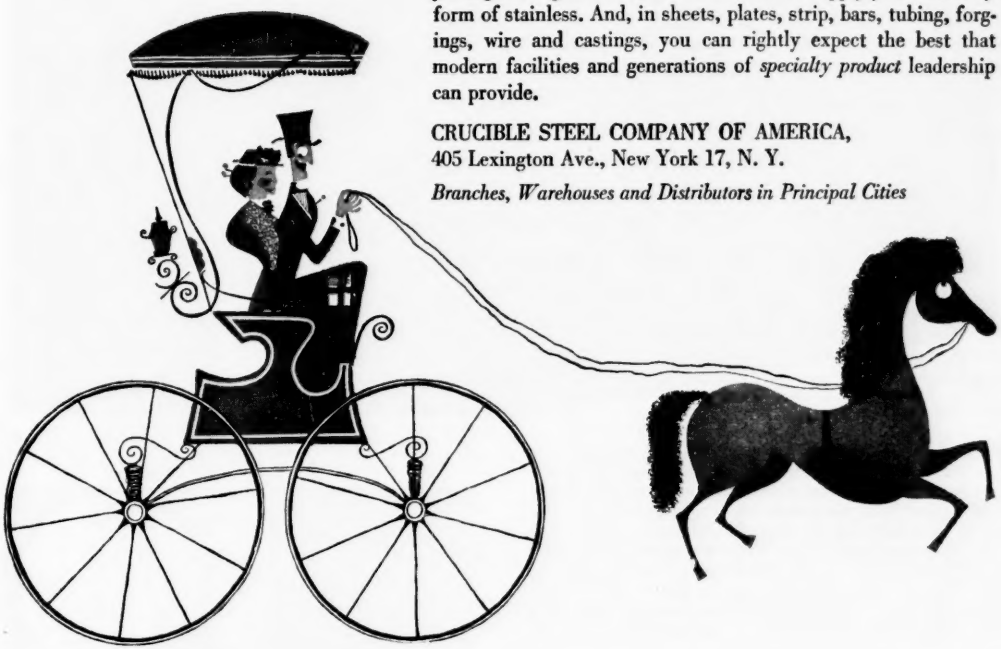

CRUCIBLE first name in special purpose steels

hot and cold rolled **STAINLESS SHEET AND STRIP**

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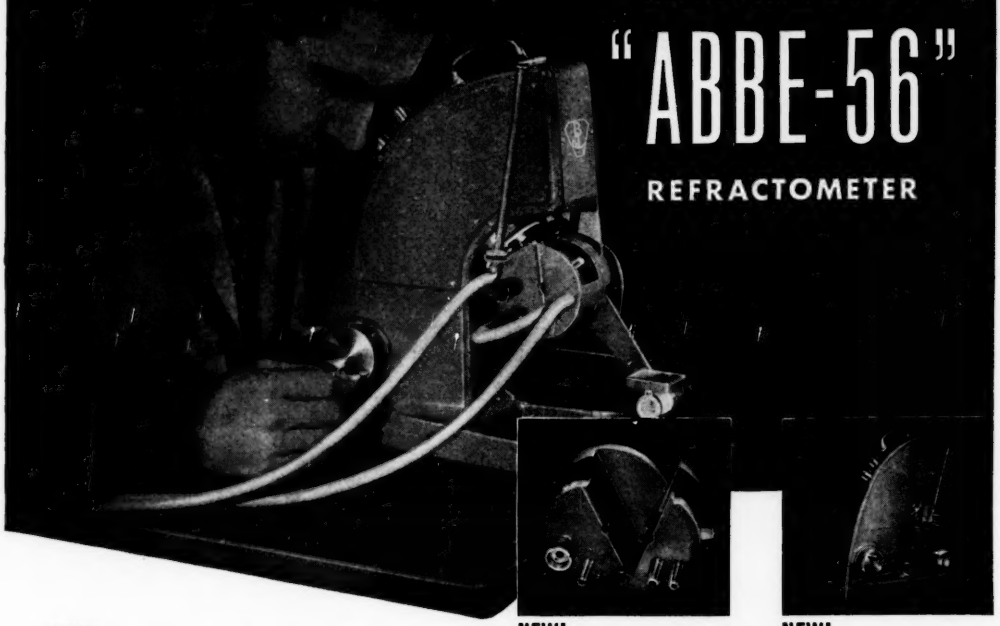


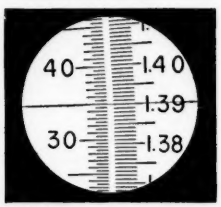
NEW throughout, from base, housing, and eyepieces to thermometer... the new Bausch & Lomb "Abbe-56" Refractometer brings you many new exclusive design features... for easier, lower cost operation... for more accurate readings. In addition to the four important performance advantages shown at the right there are advanced-design features in the telescope system, operating mechanism, prism cement, thermometer, stand, and finish. And, with all these new advancements... *there is no premium price tag.*

WRITE for complete information and a demonstration to Bausch & Lomb Optical Company. 603-G St. Paul Street, Rochester 2, N. Y.

NEW! Extra, easily interchangeable prism set available. No lost time for prism reconditioning.

NEW! Streamlined housing protects scale and its moving parts from dust, dirt, damage.

NEW! Inclined, fixed-position eyepieces mounted close together for reading comfort.



NEW! Illuminated, internal glass scales (refractive index *and* sugar percentage).

Bausch & Lomb "Abbe-56" Refractometer

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Ethavan, Monsanto's ethyl vanillin, is economical because it has three times the flavoring strength of ordinary vanillin. In addition to taste-tempting vanilla-like flavor, Ethavan gives confections a pleasing aroma that invites folks to buy. Sales and repeat sales come quickly.

Because of its superior "staying power," Ethavan holds both flavor and aroma through processes requiring extremes of heat and cold . . . through trade channels to the consumer. The uniform quality of Ethavan makes it easier for you to get identical results in your production.

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That's not meringue on the pie . . . **IT'S MOLD!**

G-E *Germicidal Tubes*

HELP PREVENT MOLD GROWTH

Of course, you have never seen a pie like this. It's a laboratory demonstration to show how a General Electric Germicidal Tube can help prevent mold growth.

Only half the pie shows mold because the other half was exposed to the ultraviolet energy of a G-E Germicidal Tube.

G-E Germicidal tubes are being used in many food and beverage plants, drug laboratories, etc., to help prevent mold growth and maintain sanitary conditions.

If you have a mold problem in your business perhaps the germicidal energy of these tubes can help you.

For more information and a copy of the free booklet, "Air Sanitation", write General Electric, Dept. 166-FI, Nela Park, Cleveland 12, Ohio.

The **General Electric Germicidal Tubes** are ultraviolet sources for disinfecting purposes. G-E Germicidal Tubes kill at least 95% of the organisms exposed to their energy. They help prevent mold growth.

In industrial use, G-E Germicidal Tubes must be used in fixtures that protect against exposure of human eyes and skin. These remarkable lamps are available in four sizes, 4 watts, 8 watts, 15 watts and 30 watts.

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STAINLESS

★ NON-CONTAMINATING

★ RESISTANT TO RUST AND CORROSION

★ SANITARY...EASY TO CLEAN

★ RESISTANT TO HEAT

★ EASY TO FABRICATE

★ STRONG...LONG LASTING

Your nearby Steel and Tubes Representative will be glad to answer your questions about the proper application of ELECTRUNITE Stainless Steel Tubing and Pipe. Just let us know when you would like him to call.

Pressure tubing for heat exchangers and condensers . . . piping for food, chemical and petroleum processing equipment . . . ornamental tubing for railings, grilles and decorative use . . . these are but some of the countless applications for long-lasting ELECTRUNITE Stainless Steel Tubing and Pipe.

As manufactured by the ELECTRUNITE Process, these modern tubular products are uniformly straight, strong and sound throughout every length and every shipment. And as indicated above, they are available in a wide range of analyses, gauges, sizes and shapes.

For complete information about ELECTRUNITE Stainless Steel Tubing and pipe, write today for a copy of Republic's new 28-page helpful fabricating guide.

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Republic REPUBLIC STEEL
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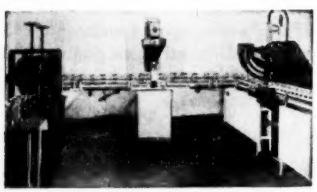
STAINLESS STEEL TUBING

20% more protection provided by Betner Thermoseal* Bags than by other closures



Bag inserter, filler and heat sealer for filling and closing bags in cartons.

We omitted "insect infestation" from the list of insurance "coverages" above, because it is not a nice subject to put into large print.

But the ability to stymie insect infestation is one more point in favor of the Betner Thermoseal* (heat-sealed) Bag that makes this bag not only worth patenting but purchasing.

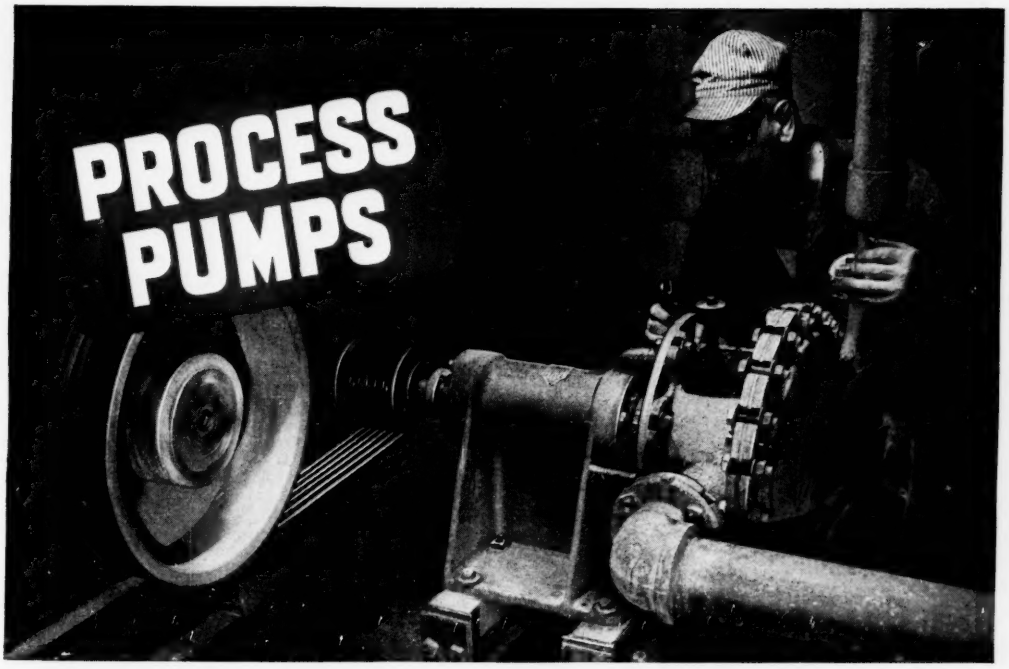
20% is the food-protecting superiority the conservative House of Betner claims for its Thermoseal* Bag. If the superiority were only half that, it would still be worthwhile. For it is in line with the ideal of all conscientious processors that foods get to market as full of the original factory flavor and cleanliness as can possibly be managed.

To date, no closure keeps the good things in, the bad things out, so nobly as does Betner's Thermoseal*. Ask us anything about it.

*Trade Mark Reg. U. S. Patent Office

Benj C Betner Co DEVON, PA.

A complete bag service—from idea to finished bag to machinery for closing coffee bags and filling and closing liner bags for cartons.



"Saves $1,000 Yearly PUMPING ABRASIVE LIQUOR!"

A-2736

No repairs in 2 years
Head and capacity maintained

A LARGE MIDWESTERN PROCESSOR used conventional pumps to handle acidulous liquor with highly abrasive carbon. Maintenance was high; breakdowns frequent. When A-C process pump took this tough job, maintenance dropped over $1,000.00 a year.

HOW THIS SAVING IS POSSIBLE

A-C process pumps give you added life and much lower maintenance costs because (1) the unique hydraulic design greatly reduces stresses on rotating parts, (2) wearing parts are separated for easy, economical replacement, and (3) you have a choice of 4 stock materials which are alloyed for resistance to different combinations of abrasion and corrosion. Other notable features include stuffing box on suction side . . . closed impeller . . . extra thick sections . . . adjustable clearance between impeller and wearing plate.

Shipment from stock on complete pumps and all parts in aluminum-bronze, Ni-resist, 18% chrome steel and 316 stainless steel. See your A-C Dealer or Sales Office or write for bulletin 08B6615.

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MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

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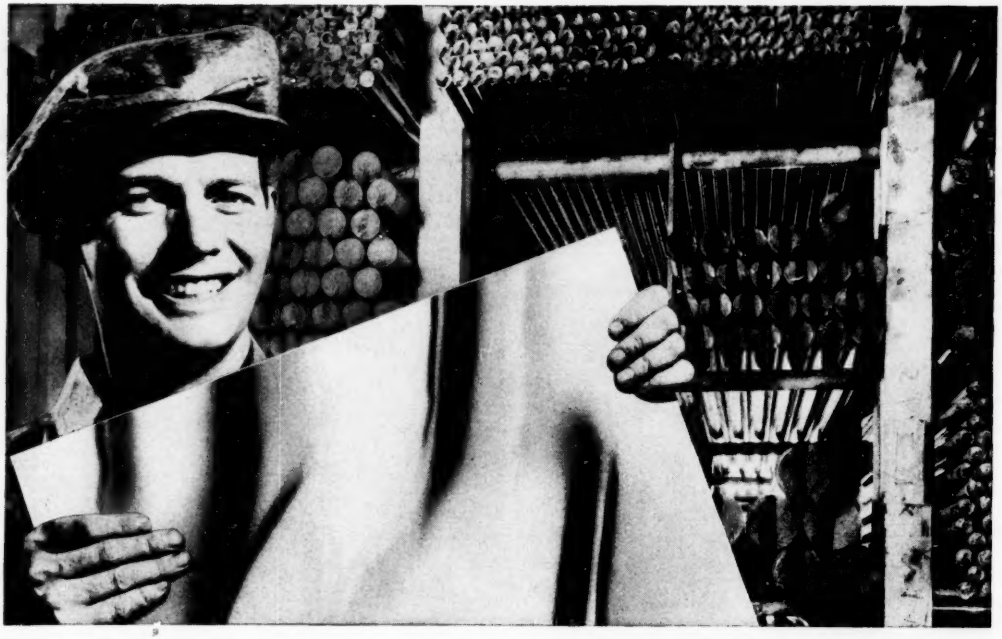

For Quick Service on Stainless Bars, Pipe, Sheets, etc.

Your nearby Ryerson plant is a quick, convenient source for everything in stainless steel. Bars, plates, sheets, tubing, pipe and other stainless products in many types and finishes are on hand for immediate shipment. And stainless from Ryerson stocks means Allegheny stainless, the time-tested product of America's oldest stainless producer.

Durable Allegheny stainless steel provides dependable protection against corrosion and high heat resistance. Its versatility, gleaming beauty and *immediate availability* frequently make it the practical metal for many uses where other steels are usually specified.

Expert technical assistance in determining the kind of stainless best suited to your special needs is available at all thirteen Ryerson plants. You can rely on it because more than a quarter of a century of stainless experience stands behind the recommendations of Ryerson stainless specialists.

So draw on complete Ryerson Allegheny Stainless stocks and be assured of quick shipment, anywhere —and dependable service. Contact the nearest Ryerson plant for all your requirements.

PRINCIPAL PRODUCTS

BARS—Carbon & alloy, hot rolled & cold finished

STAINLESS—Allegheny metal plates, sheets, bars, etc.

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Sheared & U. M., Inland 4-Way Floor Plate

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SHEETS—Hot & cold rolled, many types & coatings

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RYERSON CERTIFIED STEELS

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Joseph T. Ryerson & Son, Inc. Plants at: New York • Boston • Philadelphia • Detroit • Cincinnati Cleveland • Pittsburgh • Buffalo • Chicago • Milwaukee • St. Louis • Los Angeles • San Francisco

JULY, 1949

Food Industries

How Progress Can Be Speeded in Food Processing

Technical progress in an industry is not measured by the number of new plants or the climbing sales curve. These are merely indicators of expanded capacity and growing consumer demand.

You can produce and sell more by turning the same old wheels longer or faster, or by installing more wheels of the same vintage. But to a man with the creative spirit and enthusiasm of a true technologist or engineer, that is only a multiplication amounting to a compounding of obsolescence.

Technical progress cuts much deeper. It involves the development and application of new technological knowledge and engineering know-how. And it pays off handsomely.

Unfortunately, the rate of such fundamental progress in the food processing industry has been slower than in many other industries of lesser size and importance. Yet it is encouraging to observe the acceleration which has taken place in the last decade.

Why has our industry trailed along in the dust of others? Well, one could name various reasons, but two are predominant. They are (1) too few technically trained people, and (2) too much secrecy.

Several schools are teaching food technology and engineering, but still the number which offer full-fledged courses is pitifully small, as is the number of students enrolled. We would like to see the Institute of Food Technologists develop a model curriculum, which combines food technology and engineering, and actively encourage more of our great universities and colleges to adopt it. And we would like to see more food processors wake up to the fact that a good technologist and/or engineer is the best investment they can make—even when they pay a good salary.

But if the industry were saturated with technically trained men, the rate of progress could not be what it should, unless there be free interchange of information.

We recently had the pleasure of listening to a talk on chocolate by an outstanding technologist in that field. He surprised his audience by stating that his industry was still in the horse-and-buggy stage. Why? Because of secrecy!

Know-how has never been pooled and multiplied. There even is a dearth of literature, making it impossible for new people coming into the industry to acquire a fundamental knowledge of the technology and methods. We could name other food industries that are little, if any, better in this respect.

Conversely, fruit and vegetable technology has made great strides forward in the last 15 or 20 years. A great many technical groups and individuals have contributed advances, and the new knowledge has been made widely available. Likewise for the milk and ice cream industries.

The root of the secrecy evil lies in the short-sighted reticence of individual processors to tell others about new technology and methods. This, they think, gives them a competitive advantage. But they overlook a few things. First, they are competing with other food industries. So it behooves them and others in their field to pool their knowledge. Secondly, if they are smart enough management-wise, they can make better use of advanced practices than the other fellow. Thirdly, when an equipment manufacturer or consulting technologist or engineer makes an improvement in one plant, that party is going to spread the news among the larger companies.

As a matter of fact, an equipment builder can't afford to develop a machine or process exclusively for one processor. So about all a company accomplishes by secrecy is to foster a closed-door policy in its industry, to the detriment of itself as well as others.

So unlock your plant and contribute as much as your circumstances permit to the progress of your industry. Then others will do the same for you.

—F. K. LAWLER, *Editor*

The Talk of the Industry

Ersatz Information About Ersatz Foods

With all their scientific know-how and equipment, food technologists seem to have slipped up. They have failed to discover that "much food now sold contains basic ersatz ingredients developed by I. G. Farben, notorious Nazi cartel, during the war for German troops and civilians." We give you this startling fact on the authority of the great Drew Pearson, conqueror of generals and high government officials.

Again on the authority of Pearson, this sad state of comestibles "has been partially investigated by the Food & Drug Administration, but officials wring their hands and say they have no authority for a thorough investigation." (Wonder what happened to the Food, Drug & Cosmetic Act of 1938?)

Always eager to report the whole "truth," DP adds: "Meanwhile, there is some evidence that ersatz affects the health of the nation."

There also is some reason to believe that ersatz information affects the health of the nation.

New Developments Boost Ion Exchange

Progress continues in ion exchange, a useful food processing "tool" with an interesting future. New resins with controlled pore sizes are highly selective molecule separators. They can absorb molecules with a width of 10 Angstroms and leave those measuring 20 Angstroms untouched, despite the ionization constants involved.

The problem of bacterial growth in ion exchange beds, used in processing foods, apparently has been solved. A new chemical—Chloromelamine—is said to sterilize the beds. It oxidizes a bed sufficiently to prevent bacterial growth, but the chlorine involved is not strong enough to react with the resin.

Fraudulent Claims Related to Prosperity

In assisting its members to defend themselves against unwarranted consumer-damage claims, National Canners Association has come up with an interesting discovery. It finds that the general economic conditions have an important bearing on the number of such cases. The sharpest rise was during the prewar depression years. As soon as a high employment level was reached, the number of claims diminished rapidly.

So if business slumps badly get your legal department mobilized for more battles in the courts. Many normally honest people will bend their conscience to make an extra dollar in lean times. Ambulance chasing lawyers like to eat, too.

Making Quick Sense Out of Dollars

As much as people are interested in money, it is very difficult to get them to read and understand a corporation financial statement. Yet it is highly important that stockholders, labor and people in government savvy these statements.

Realizing this, managements of many companies have used various devices to present a simple and interesting picture of the income, expenditure and profit items of their annual reports. And we give you two interesting examples from the food industries.

McCormick & Co.'s annual report has a 4½x5-in. golden frame printed on the cover. Inside this is a "Brief Picture for Busy People." It consists of highlights for those who do not wish to read the full report. It also is a means of getting across facts which the average layman would not dig out of a complex financial statement. It mentions dividends, reinvested earnings, reduction of loans and sales. It concludes with a one-line paragraph which reads: "Our prospects for the future are excellent."

American Sugar Refining Co. presents a graphic story of its income and its disposition. Millions of dollars are shown as stacks of golden coins. In cartoon style, a domestic consumer and a Cuban producer throw into a hopper the dollars received from domestic and Cuban sources.

From this hopper the money flows through a tapering pipe with a series of outlets. The first represents expenditures for sugar cane, raw sugar and mill and refinery supplies, with a pile of dollars portraying the amount. Other outlets represent wages, salaries and pensions; sundry expenses, insurance and selling and administrative expenses; taxes; and depreciation. What is left comes out the end of the pipe (much reduced in size by this time). This amount is split into: (1) dividends paid to 23,043 stockholders, "the real owners of the business," and (2) the amount left for modernization, expansion or unforeseen needs.

These are two ways of making dollars talk plain English.

Hors d'Oeuvres

■ U. of Illinois reports an experimental "man-made milk" that causes baby pigs to grow faster than sow's milk. We men are sure getting there, aren't we.

■ Research, supported by National Dairy Council and American Dairy Association on nutritional needs for persons growing older, comes up with the answer that they need more milk and milk products. In fact, says the report, they need just as much as younger persons. Trouble with Ponce de Leon is that he didn't look in the right place for his fountain.

■ *The Cincinnati Enquirer, Post,* and *Times-Star* have agreed not to print any advertisers' superlatives that can't be verified. It'll be interesting to see how Best Foods, Inc., makes out on this proposition.

■ GI students taking the food handlers' course at City College of New York found that Uncle Sam's supplies for them included one bottle of red ink. Wonder if this course might not be a little too practical.

■ National Bureau of Standards goes on record to explain that "The International Commission for Uniform Methods of Sugar Analysis was founded in 1897 to establish uniform methods for the analysis of sugars. . . . ." You gotta nail these things down.

■ To those who are wondering whether they are attending IFT's ninth annual convention, conference or meeting, we can report that it depends on who is telling you. Convention, says the official program; conference, says President Diehl, meeting, says the by-laws. Anyway, you are safe as far as ninth annual. J.A.J.J.

MANUAL jobs in the food plant are speeded, operators' work eased, by lessons learned in quick chart analyses.

Simplify Your Plant Tasks the Symbol Way

Easy chart system, exemplified in cannery, puts industrial engineering to work cutting job movements. Results: Time saved, costs down, output up

GERALD NADLER
Instructor in Industrial Engineering, Purdue University, Lafayette, Ind.

Substantial savings can be made in the food plant through more effective procedures developed by use of operation charts to analyze the employees' tasks. Through these charts, much work which has been believed necessary can be virtually eliminated. An operation as simple as box forming illustrates this fact.

The operation charts to which we refer are symbolic presentations of the specific work of an individual at one workplace. The usefulness of this type of chart is readily seen, since many a job in the food plant is performed by an individual staying at one work station.

Employment of this approach is particularly convenient because of the fact that the charts may be made with paper and pencil and in a small amount of time. The results of these simple analyses often astound even the most experienced.

This type chart is usually made to analyze the work involved in an operation—by breaking down the elements of the work by operation symbols on a process chart.[1] There is one limitation, however: The operation must be performed by a human being. If the operation is entirely machine controlled there will be no need for making a chart.

Greatest value is obtained from operation charts when the work on the job is entirely controlled by the worker. As will be noted later in this article, the charts can be expanded to include any operation in which a machine has partial control.

In like manner, the charts may be employed to analyze and portray the work of individuals working as a group; *i.e.*, where the workers aid each other in the performance and completion of a task. The charts form the basis for analyzing the activities of a worker or workers, whether or not aided by machines, usually working at a location which is essentially one workplace.

The worker, of course, employs hands, feet, and perhaps other of his various body members in the performance of his duties. The activities of each of these body members can be shown on the operation chart. It is even possible, for example, to chart the motions of the eyes and head, as well as the hands and feet, if the job requires their particular use. However these charts are usually associated with right and left hand breakdowns. They show the relationship of work performed by the body members as well as the sequence of the work involved.

To facilitate the construction of these charts, symbols are used to denote certain types of activities.[2] The symbols are similar to those used in process charts.

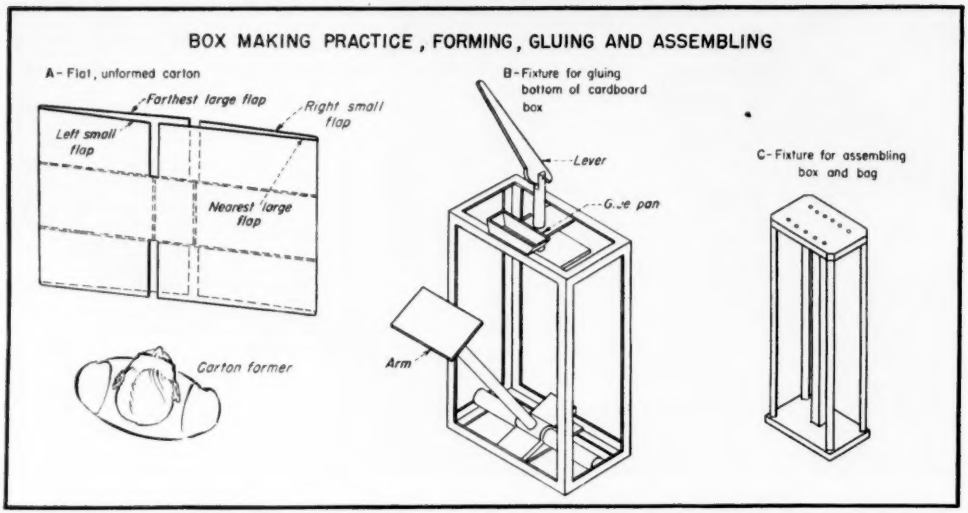
Carton Forming Described

To give a simple illustration of an operation chart, a job that is present in virtually every canning plant will be detailed in the following paragraphs.

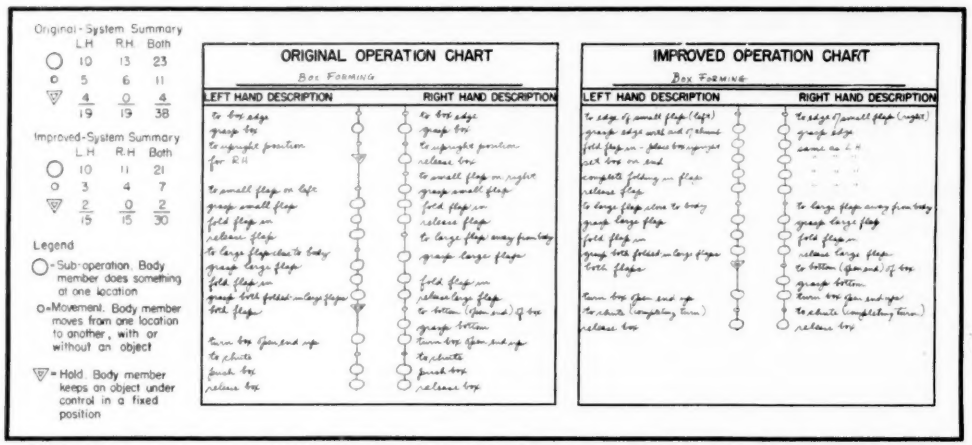
When cardboard boxes arrive at the canning plant, they are not in final shape, hence must be formed. True, this operation is a rather simple job. But in the plant where this study was made, it had been noted that at times two persons were required to form boxes to assure a steady flow to the caser. One of the persons worked only a small part of the time. This posed a question: "Was there any way of reducing the amount of time to form a box so that only one person would be required to perform the task?"

To determine the precise method used in forming the boxes, the original

Carton Former's Work—An Analysis That Helped Streamline It



ELEMENTS of box-making. These sketches will aid readers in following details of the carton-forming routines.


Original-System Summary
L.H. R.H. Both
10 13 23
5 6 11
4 0 4
19 19 38
Improved-System Summary
L.H. R.H. Both
10 11 21
3 4 7
2 0 2
15 15 30
Legend
○ = Sub-operation. Body member does something at one location
O = Movement. Body member moves from one location to another, with or without an object
▽ = Hold. Body member keeps an object under control in a fixed position
ORIGINAL OPERATION CHART
Box Forming
LEFT HAND DESCRIPTION
RIGHT HAND DESCRIPTION
IMPROVED OPERATION CHART
Box Forming
LEFT HAND DESCRIPTION
RIGHT HAND DESCRIPTION

SYMBOLS show that new carton-forming method cuts handlings from original 38 to 30 (see summaries, left).

operation chart was made (see illustration). In general, the method used is detailed in the following paragraphs. The reader will be aided in tracing the routine by reference to Sketch (A) in the accompanying drawings.

Both the right and left hands went to, and grasped, the top edge of the unformed box and brought the top edge of the box to an upright position in front of the operator. While the left hand held the box, the right hand let go of it and went to the small flap on the right side. Then, as the right hand gained control of the box, the left hand slid along the top and grasped the small flap on the left hand side. The hands then pushed in, and turned, the small flaps so that the box became partially formed.

After release of the small flaps, the right hand traveled to the large flap farthest from the operator while the left hand traveled to the large flap nearest the operator, and both hands grasped and pushed in the respective flaps. While the left hand grasped and held down both of the large flaps, the right hand released the box and went to the bottom, open end of the box, grasped it, and both hands turned the box upside down so that the folded portion of the box was on the bottom. Both hands were then used to carry the box to the chute, where it was released with a push.

The unformed boxes were kept on a table approximately 1-ft. high, hence the worker had to bend down at the beginning of each cycle to obtain a box. The worker also complained of hurting her wrists when pushing in the small flaps and turning the box.

Improved Method Developed

Motion and time studies have developed certain principles, and these should form the basis of the proper performance of a task. The greatest value can be derived from these principles by use of a check-list of ques-

tions. After an operation chart is made, it is then possible to determine whether or not any of the check-list questions apply to the particular operation. If they do the next step is to formulate suggestions that may aid in improving the operation.

This procedure was followed with the box forming operation. Since we are presently interested only in showing values of the motion and time technics, no attempt will be made to expand on the details of the check-list, but references are available.[3]

An improved-operation chart for the box forming operation is shown. The old 1-ft. table has now been replaced by one 2½ ft. in height. The improved method (refer to carton sketch) is as follows:

A Little Thumb Action

The right and left hands go to, and grasp, the small flaps on the edge of the box farthest from the operator. The right hand separates the unformed box with its thumb while grasping the small flap. This process of slightly separating the top edge of the unformed box is aided by the hands pushing the box against the thighs. The hands then start to push in the small flaps, while bringing the top edge of the box to an upright position. The hands now set the box on the open end and complete the task of pushing in the small flaps.

The hands then release the flaps, and the right hand goes to, and grasps, the large flap farthest away from the body of the operator, while the left hand goes to, and grasps, the flap closest to the operator. The hands then push in the flaps. The left hand holds both the flaps down while the right hand travels to, and grasps, the bottom, open end of the box. The box is then turned right side up and moved to the chute at the same time, so that the folded portion of the box is on the chute. The box is released down the chute without a push.

A check was taken on the amount of time needed for performing the original and improved methods of this operation. The original method was found to require approximately 4½ seconds to complete a cycle. The improved method was found to take approximately 3½ seconds. The improved method, therefore, results in a 22 percent saving of time per formed box. It was also learned that with use of the improved method the operator no longer hurt her wrists.

Total time consumed in analyzing this operation, using an operation chart, was 1½ to 2 hours. This is an indication of how little time is necessary to make an operation chart and receive good results. With the saving of time by the improved method, one operator was all that was needed to insure a steady flow of boxes to the caser.

Bag Insertion Analyzed

In another part of the canning plant, other boxes were assembled, and waterproof bags inserted in them, to facilitate the storage of frozen peas. The original method for performing the complete assembly of box and bag was performed by three men. Each man had a different task. The three different jobs were: Stenciling the box, forming and gluing the bottom of the box, and inserting a cardboard separator and waterproof bag. Since the operation charts of these three jobs are quite lengthy, only a rough description of the different tasks and the means by which the operation chart aided in finding a better way.

The first job was stenciling the necessary information on what was to be one of the sides of the box. The unformed boxes were placed on a table 2½ ft. high with a top of 5 ft. 2 in. by 2 ft. 6 in. The operator was seated on one of the long sides of the table in front of the unstencilled boxes, which were placed to his left. The left hand always held the steneil while the right hand always held the brush. The left hand would position the stencil on the unformed box while the right hand applied the brush in horizontal strokes, working from top to bottom.

After completing the stenciling, each of the hands would go to their respective sides of the unformed box, while still holding their tools, and grasp and transport the unformed box to the right. The left hand would then complete putting aside the unformed box with a little push onto the pile of stenciled boxes. Then the hands would start on another cycle.

The stenciled, unformed boxes were placed on a 1-ft.-high stand, to the right and a little to the rear of the boxmaker. He had four fixtures—such as the one shown in Sketch (B)—upon which he placed boxes. After glue was applied, each box was held in place so that the glue could take hold.

To be more specific, the boxmaker's job consisted of the following steps: H first turned to the table of unformed boxes and picked up one box, with his right hand on one of the small flaps that was to be the bottom of the box, and with the aid of the other hand opened the box by pushing in and turning the small flaps. He then turned, and placed the box over the arm of one fixture. The right hand then reached over and grasped the glue brush, brought it back to the box, and applied it to the small flaps of the box.

The left hand, in the meantime, was holding the box on the arm so that the small flaps were lying flat. After disposing of the glue brush, the right hand went to the lever while the left hand pushed the arm under the press. The right hand then pulled down the lever and the bottom of the box was pressed together. The boxmaker then continued by placing a box on each of the three remaining fixtures.

After the last box was under the press, the operator waited approximately ¼ minute. Then, starting with the first press, he pushed up the lever with the right hand while the left hand controlled the arm, removed the box with both hands, and threw the box to the area of the third operation, assembly.

The assembly operator picked up a wax-lined bag and placed it over a fixture—see Sketch (C)—then picked up a cardboard insert and placed it on top of the bag as it lay on the fixture. Next, he picked up a box and, holding it by the top small flaps with each hand, pulled the box over the bag on the fixture. Then he lifted the entire box and bag assembly off the fixture and pushed it down the chute.

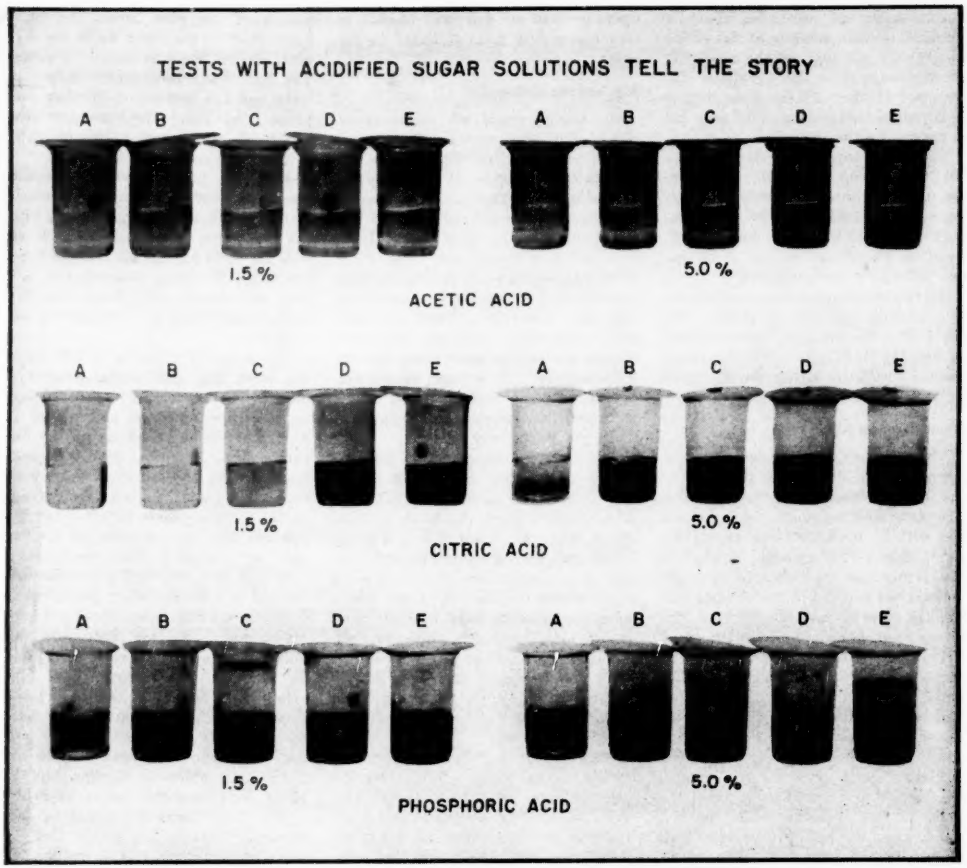
It will be noted that a considerable amount of time and effort was spent in handling the box in the three different operations. Waiting time was involved, too—while the glue took hold on the box. This information, plus suggestions from the check-list questions, resulted in combining all three operations into one. One operator now has two fixtures, instead of the old four, with which to work. And he alone completes the entire assembly.

The new fixture is similar to that shown in Sketch (B), except that the arm has been made a little smaller and prepared with the same beveled edges and holes as the top of the fixture in Sketch (C). A wooden frame holding the stencil is now attached to the side of each fixture, so that the stencil can be easily pushed against the box by the operator. Two operators are now able to produce as many completed boxes as three operators did formerly—effecting an approximate 14 percent savings in time per complete assembly.

The new method consists of placing the paper bag on the arm; forming the box and partial placing it over the bag on the arm; placing the cardboard insert on the bag through the bottom of the box; applying glue; putting the box in the press; stencilling the side of the box; and removing the completed box and bag assembly.

References

1. For further reference, see G. Nadler, *Industrial Engineering Cuts Labor, Time, Handling*, May Food Industries, Vol. p. 585.
2. For a more complete discussion of the uses of symbols for operation, see M. E. Mundel, *Systematic Motion and Time Study*, Prentice Hall, N. Y., 1947, pages 48-49.
3. Ibid., pages 51-53.



FAVORABLE EFFECT of dextrose is graphically shown by degree of color developed when dextrose-sucrose solutions (60 percent total sugars) are acidified and then boiled for 10 minutes. Both 1.5 and 5.0 percent acidifications are shown. Solutions in beakers: (A) 100 percent dextrose; (B) 75 percent dextrose, 25 percent sucrose; (C) 50 percent dextrose, 50 percent sucrose; (D) 25 percent dextrose, 75 percent sucrose, and (E) 100 percent sucrose.

Dextrose Will Curb Color Changes In Heat-Treated Acid Foods

When substituted for a portion of the sucrose, it acts to allay browning. Thus a better food product is obtained

R. F. COHEE and R. D. WALTER

Corn Products Sales Co., Technical Service Chicago and Memphis, respectively

Question: What roles do sugars play in the darkening of acid foods during heating?

Answer: Sugars play an active part. The color changes are less, however, when dextrose is used as a portion of the total sugars.

It was the posing of this question that led to the recent series of tests in the Technical Service Laboratories of the Corn Products Sales Co. And the answer was indicated after careful collation of the resulting data.

The procedure was to boil dextrose, sucrose, and various mixtures of them at 60 percent total sugar level in water acidified by such acids as acetic, citric and phosphoric. Acid concentrations were 1.5 and 5.0 percent.

Each sample was prepared by adding 100g. of boiling distilled water to the sugar in a 300 cc. tallform beaker. The selected acid was added and the mixture boiled gently for 10 min. over a Fischer burner. Every sample was stirred during the addition of water and acid. In each case, the sample was cooled, then weighed to determine evaporation loss, after which distilled water was added, generally 15 to 20 g., to approximate the original weight.

Dextrose Retards Sucrose Inversion

Colors were determined by optical density. Other determinations were made by standard methods for sugar analysis. Results are given in Tables I, II and III, and the solutions are shown pictorially above.

Data in Table I, for the acetic acid series, show that degradation of the

sugar proceeds simultaneously with inversion. Increase in color is an indication of breakdown products. However, the sucrose is not completely inverted. An interesting observation is that the percentage of uninverted sugar, on the actual sucrose basis, is greatest in the presence of increasing amounts of dextrose. To that extent, dextrose appears to have an inhibiting effect on inversion (see column headed "Percent Uninverted Sucrose Basis"). This effect is noticeable in cases of both 1.5 and 5.0 percent acetic acid content.

In the case of 1.5 percent acetic acid (Sample No. 2), the 3.4 percent sucrose remaining was 13.6 percent of the 25 percent ratio of sucrose to total sugars. In Sample No. 5 of the same series, 10.1 percent sucrose was used.

Citric Differs from Other Acids

In Table II, for the citric acid series, a slightly different effect is observed with 1.5 percent acid, probably due to the non-volatility of citric acid. There is degradation with 1.5 percent citric acid in all five cases, but the degradation is of no practical significance, except in respect to reducing potential.

From the standpoint of color, the results are significant—even a superficial examination proving that the increase in color is not stoichiometric. Again, dextrose appears to have some inhibiting action—in this case, a function of anti-degradation.

Dextrose shows a much more obvious inhibitive action with 5.0 percent citric acid. Significant degradation (column headed "Percent Uninverted Sucrose Basis"), as indicated by loss of reducing potential which has taken place, is definitely a function of the increase in color.

Neither the degradation nor the increase in color is stoichiometric. The actual degradation is an increase, from 8 to 25 percent at 100 percent sucrose level, relative to the actual sucrose originally in solution in Samples Nos. 2 and 5 (Table I).

Color Levels Off

A slightly different condition seems to exist in the phosphoric acid series (Table III). In that series there is an increasing amount of degradation, which again indicates that dextrose has an inhibitive influence. The color increases greatly with increasing sucrose replacement, however. And at high intensities, the color seems to evidence a leveling-off characteristic. This effect, occurring with both 1.5 and 5.0 percent phosphoric acid concentrations, may indicate a secondary degradation.

Correlation of the data in Tables I, II and III with the colors of solutions (see group photo heading this article), shows that dextrose and sucrose are definitely affected during short periods of boiling in acid solutions. The photos also indicate that one type of organic acid—phosphoric—affects dextrose and sucrose to a greater extent that does any other acid—even at the same concentration.

Subject Frequently Discussed

Making of these tests was stimulated by the fact that the subject of browning or darkening has been discussed at nearly every recent meeting concerned with technical aspects of food processing. Also, for some unknown reason, few references have been made to the reactions of sugars in acid media. This omission is difficult to explain in view of the very large quantity of sugars used in the processing of such acid foods as canned fruits, preserves, jellies, pickles and catsup, which are both acid in reaction and heat-treated.

The omission is further puzzling because several research workers have previously reported on reactions having a definite relation to the browning of sugars in acid solutions. Eickelberg[1] identifies the colors produced by dextrose and sucrose under extremes of heat-treating for varying and lengthy periods of time. Synthetic mixtures

(*Turn to page* 184)

How Dextrose Inhibits Discoloration and Sucrose Inversion

Effects Upon Color and Inversion of Sugar Solutions When Acetic, Citric and Phosphoric Acid, Respectively, are Added and the Solution Boiled for 10 Minutes

TABLE I—ACETIC ACID

Sample No.	% Dextrose Sugar Basis	% Sucrose Sugar Basis	% Acid C.B.*	% Sugars D.S.**	% Uninverted Sucrose Basis	% Reducibles Sugar Basis	% Sucrose Remaining	Color 60% Solution D.S.**
1	100	0	1.5	60.0	....	100.0	....	0.50
2	75	25	1.5	59.2	13.6	96.6	3.4	1.80
3	50	50	1.5	62.3	11.0	94.5	5.5	2.56
4	25	75	1.5	65.1	10.3	92.2	7.8	4.02
5	0	100	1.5	62.6	10.1	89.9	10.1	4.60
6	100	0	5.0	61.3	....	100.0	....	0.50
7	75	25	5.0	61.5	6.0	98.5	1.3	1.70
8	50	50	5.0	65.5	5.4	97.3	2.7	3.52
9	25	75	5.0	63.5	4.7	96.5	3.5	4.61
10	0	100	5.0	64.5	4.7	95.3	4.7	6.21

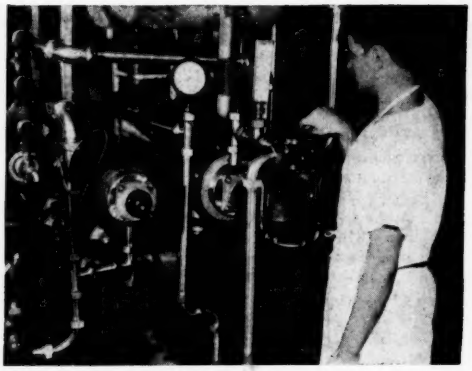
TABLE II—CITRIC ACID

Sample No.	% Dextrose Sugar Basis	% Sucrose Sugar Basis	% Acid C.B.*	% Sugars D.S.**	% Uninverted Sucrose Basis	% Reducibles Sugar Basis	% Sucrose Remaining	Color 60% Solution D.S.**
11	100	0	1.5	61.7	....	100.0	0	0.50
12	75	25	1.5	61.0	....	100.0	0	3.64
13	50	50	1.5	62.0	....	100.0	0	6.16
14	25	75	1.5	64.5	....	100.0	0	13.10
15	0	100	1.5	59.5	....	100.0	0	20.00
16	100	0	5.0	59.6	1.3	98.7	0	1.12
17	75	25	5.0	62.7	3.3	96.7	0	13.10
18	50	50	5.0	60.1	5.2	94.8	0	21.10
19	25	75	5.0	60.7	10.2	89.8	0	57.00
20	0	100	5.0	60.3	24.2	75.8	0	352.00

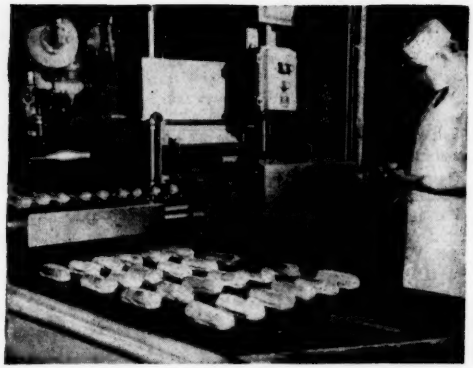
TABLE III—PHOSPHORIC ACID

Sample No.	% Dextrose Sugar Basis	% Sucrose Sugar Basis	% Acid C.B.*	% Sugars D.S.**	% Degradation	% Reducibles Sugar Basis	% Sucrose Remaining	Color 60% Solution D.S.**
21	100	0	1.5	58.3	11.0	89.0	0	15.9
22	75	25	1.5	60.7	11.9	88.1	0	192.0
23	50	50	1.5	63.2	13.8	86.2	0	432.0
24	25	75	1.5	65.2	15.4	84.6	0	448.0
25	0	100	1.5	62.2	19.2	80.8	0	760.0
26	100	0	5.0	57.1	22.6	77.4	0	26.5
27	75	25	5.0	62.3	23.9	76.1	0	805.0
28	50	50	5.0	65.8	26.0	74.0	0	1790.0
29	25	75	5.0	66.4	28.7	71.3	0	2450.0
30	0	100	5.0	64.1	32.4	67.6	0	2890.0

* C.B.: Commercial basis, i.e. "as is" ** D.S.: Dry substance, i.e. "dry solids"



Unit makes custard in 2 min.



And it goes into shells automatically

Eclair is "sealed" by chocolate coating

And safeguarded from all human contact

Continuous, Closed Line Assures Purity in Eclairs

Custard is rapidly cooked and cooled and automatically filled into shells in Hanscom's new processing system that protects wholesomeness

PHILIP N. SIMON, RICHARD PRINCE, and LOUIS J. SMERAK
Hanscom Baking Corp., Long Island City, N. Y.

Custard cream-filled pastry can now be produced without the hazards of bacterial contamination — particularly those from food poisoning organisms.

The new process, unlike the conventional open batch method, is continuous, and it is conducted in a closed system.

Notable features in this process used by the Hanscom Baking Corp. are: (1) Adoption of Votator equipment to do the cooking and cooling of the custard in a matter of seconds, (2) development of a machine to fill custard into pastry shells automatically, and (3) use of precautionary measures to cut down human contamination.

The problem with pastry fillings is that the ingredients—milk, sugar, eggs, and starch—are ideal for the growth of food poisoning organisms and thermodurie (heat-resistant) organisms. The former cause gastro-intestinal illness; the latter sour the fillings.

Bacterial Contamination a Problem

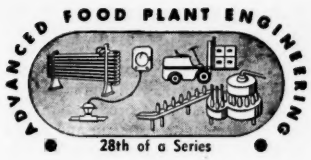
Let us first review the difficulties:

According to the U. S. Public Health Service,* the greatest single contributor to outbreaks of food poisoning has been custard cream-filled pastry. Consequently, the baker copes with a hazard when he includes custard pastries in his line and there is a constant headache for the public health official. Many large bakers refuse to make custard goods.

As stated, thermodurie organisms create a problem of souring. Many of these organisms are not destroyed in custards during a normal 185 to 195 deg. F. cook. During the slow open-table cooling process, those organisms already present have an excellent opportunity to multiply. In addition, there is a possibility of further contamination. Furthermore, conditions are excellent for the entry of more organisms during filling into pastry shells.

Refrigeration of eclairs merely temporarily inhibits growth of such organisms. After eclairs are purchased,

* Ordinance and Code Regulating Eating and Drinking Establishments," *Public Health Service Bulletin*, No. 280, p. 41, 1943.



holding them at room temperature for several hours gives free rein to the souring thermodurics.

Rebaking custard-filled eclairs before they are iced will kill food-poisoning bacteria** and reduce the number of thermodurics. But when this is done, the product is not satisfactory. The filling shrinks away from the shell, giving a half-filled appearance to the eclair. Also, the rebaking operation materially raises production costs.

Troubles With Regular Method

Heating large batches of custard above 195 deg. F. is difficult in steam-jacketed kettles. Custard is viscous and consequently a poor heat conductor. Therefore, there is difficulty in cooking it uniformly above 190 deg. F. without scorching it. Overheating ruptures the starch granules. When this happens, the custard "weeps" (shrinks and exudes water) and the eclair becomes soggy.

So, to sum up, objections to the conventional method of making eclairs have been: (1) Difficulty of cooking custards to temperatures high enough to kill food poisoning and thermodurie organisms, (2) lack of a way to rapidly cool custards, and (3) possibility of contamination while custard is being hand-filled into pastry shells.

Custard generally takes 20-30 min. to cook in direct-fired or steam-jacketed kettles and several hours to cool. The cold custard is run into the hopper of the filling machine, then a predetermined amount is injected into pastry shells by the operators. In many small bake shops, the shells are slit longitudinally and hand-filled. The eclairs are finally decorated with a strip of chocolate icing.

Developing New Process

The specific problem was to devise a method of making custard-filled eclairs that would eliminate bacterial contamination and assure a desirable product at reasonable cost. The idea was conceived to adapt to eclair production, the process used for pasteurizing, cooling, and bottling milk in a closed system. Custard cream is a viscous fluid when just made. And the eclair shell is similar to a container.

A continuous method of rapidly cooking and cooling the custard was developed so that food poisoning and thermodurie bacteria would be destroyed, further contamination prevented, and a satisfactory filling made.

Pilot trials were then conducted to cook and cool the custard in Votator processing equipment—similar to the apparatus used to prepare starch paste in the manufacture of salad dressing. The result was a custard far superior to that made by the conventional method. The custard was very smooth and uniformly cooked.

Surprising, too, was the fact that the 15-sec. 230-deg.-F. cook in Votator equipment did not result in a weeping custard. This is probably due to flash heating and quick cooling.

By connecting two 100-gal. slurry tanks to the equipment, a continuous operation is carried out. Ingredients can be added and mixed in one tank, while custard is being processed from the other tank.

How Cooker and Coolers Work

The Votator processing equipment itself consists of three insulated horizontal cylinders, each having a rotating shaft with scraper blades. The first cylinder is steam-jacketed and works on 50 lb. of steam pressure. The second is water-jacketed, operating on 25 gal. of water a minute. And the third is cooled by direct-expansion refrigeration. The custard is cooked in the first cylinder, precooled in the second, and finally cooled in the third.

An automatic flow-diversion valve was installed at the discharge end of the cooking cylinder. If the custard is undercooked, this valve instantly diverts custard leaving the cook cylinder back to the slurry tank for reprocessing.

When custard reaches the prescribed temperature, the flow-diversion valve closes. Normal flow then takes place through the cooling cylinders. Automatic recording controls maintain cooking temperature within 2 deg. F.

Effective Sterilization

As much as 800 lb. of uniformly smooth custard cream can be heated to 230 deg. F. and cooled to 40 deg. F. each hour. Laboratory and pilot plant data showed that custard inoculated with *Staphylococcus aureus* and *Escherichia coli* can be pasteurized at 185 deg. F. in 15 sec.

However, such pasteurization does not destroy enough thermodurics. Subsequently, a 230-deg.-F. cook for 2 min. was found adequate to reduce these organisms. Accompanying box shows that an almost sterile custard was obtained.

The Votator units are not normally equipped for the 2-min. custard cook. So a special holding coil made of sanitary pipe was looped between cooking and water cylinders. Thus, a 2-min. holding time can be maintained at 220-230 deg. F.

Cooling custard to 40 deg. F. has several advantages: (1) Time required to set the custard is shortened; (2) quick-setting prevents the filling from soaking into the pastry shell and making the shell soggy; and (3) bacterial growth is reduced to a minimum during subsequent filling and enrobing and during distribution of the goods to the stores.

The common feed pipe from the two slurry tanks to the lobe-type positive-displacement pump is also connected to a water line. Thus, a third tank is not needed for the water to flush the Votator cylinders at the end of operations. The water is also used to push out custard remaining in the equipment. In this way, about 50 lb. of custard is recovered. A two-way valve and timing prevent the water from entering the filling hopper.

Pastry Filled Automatically

The custard is piped from the cooling cylinder directly into the closed hopper of the specially designed eclair-

(*Turn to page* 186)

How Quick Cook Curbs Bacteria

Of 11 uncooked custard lab-test samples with per-gram bacteria counts of—

1,310,000	2,700,000
885,000	2,150,000
183,000	7,200,000
184,000	28,600
172,000	11,400

and 218,000

. . . every one counted less than 100 bacteria per gram after a 2-min. Votator cook at 230 deg. F.

How Eclairs Retain "On-Table" Quality

In 14 samples of custard taken from new-process eclairs that had stood for 12-16 hr. at room temperature, the bacteria counts per gram were only—

4,400	1,000
2,800	2,000
6,000	1,400
5,000	2,000
1,800	3,500
2,600	1,400
3,000	and 900

. . . giving the very low average of 2,700 bacteria per sample—which is noted as far under the 30,000 limit set for bottled milk by New York City.

** J. Stritar, G. M. Dack, and F. G. Jungewalter, *Food Research*, 1, 237, 1936.

MOUTH LESIONS, commonly attributed to riboflavin deficiency, were prevalent in 1944 (21.7 percent). But by 1948 incidence had dropped to 9.7 percent—a significant improvement credited to increased riboflavin in enriched flour.

Enriched Food Products Are Credited For Better Health in Newfoundland

Check on population, after four years of bolstered diet that included improved margarine and flour, conclusively proves value of fortified products

R. M. WILDER

Professor of Medicine,
Mayo Foundation, Rochester, Minn.

Thanks to the island government's enrichment program, the Newfoundlander is healthier today than he was four years ago. This is clearly indicated by results of two clinical surveys of the island's population—one in 1944, one in 1948.

In 1944, malnutrition was common in respect to vitamin A, thiamin, riboflavin, niacin and ascorbic acid. At about this time, however, a number of corrective measures were instituted, including fortification of margarine with vitamin A, and enrichment of wheat flour with B vitamins.

When, in 1948, the investigators returned to Newfoundland and resurveyed the population, the state of nutrition with respect to vitamins A and B had progressed from unsatisfactory to satisfactory. Much of the apathy and listlessness observed in 1944 was gone. The reported death rate had fallen, and still births and deaths of infants less than 1 year of age were strikingly reduced.

The bearing of these data on the significance, to public health, of the bread and flour enrichment program in the United States warrants emphasis. This program, involving initial enrichment of white flour and white bread, and later of degerminated corn meal, was introduced at the beginning of the recent war as a method for improving a dietary situation considered precarious.

American Dietary Habits

Reliable estimates of the food consumed during the 30-year period preceding 1940, show that American diets have improved in a number of respects. Over these years, increasing quantities of dairy products, green and yellow vegetables, and citrus fruits were consumed. These changes resulted in increased amounts of several nutrients—notably vitamins A and C—in the food supply per head.

Adequacy of the diet with respect to vitamin B_1 and niacin had steadily declined, however. This was explained by two changes in the food environment: Replacement of the slightly-longer-extraction flour of the 1800's with white flour, and the tremendous rise in use of sugar. These two products accounted for nearly half the calories of American and western European diets, yet both foods were poor in vitamins.

White flour, in its production, loses half or more of the thiamin and niacin of wheat. And sugar contains no vitamins at all, or almost none. Also, in this 30-year period, 1910 through 1939, the consumption of grain products (mostly flour) was cut almost in half. The vacuum thus created was filled in two ways—to a minor extent with foods that carry more vitamins than does unenriched white flour, and to a major extent with sugar, which contains less.

This, then, was the background of factors leading to enrichment of white flour. It might have been more sensible, as some have thought, to adopt use of whole wheat flour and to eat less sugar. But educating people to eat less sugar and to eat brown flour had proved to be a hopeless task, whereas vitamins and minerals could be added to white flour without any change in color, taste or cooking qualities. And these vitamins were made relatively inexpensive through technical developments.

Widely Approved Program

The program was endorsed by all the important public health bodies of the country, among them the Food & Nutrition Board of the National Research Council, the American Medical Assn., and the American Public Health Assn. It also received the full support of the national organizations of millers and bakers. Principally because of them, enrichment was extended within a year or two to cover some three-fourths of the nation's bread and family flour.

In the meantime, the Army and Navy had demanded enrichment of their flour, and in 1943 War Food Order No. 1 had required enrichment of white bread. Effective period of the War Food Order came to an end in 1946, but by then more than 20 states had laws requiring enrichment of bread and flour. In several of these states, provision for the enrichment of corn meal was included in the enrichment law.

The enrichment program's rapid extension was truly astonishing—and all the more surprising because support for it was largely based on theoretical grounds. Benefits had been demonstrated only by experiments on animals and by very small scale feeding studies with human subjects. Also, the need for the program was not too evident, since the outward signs of vitamin deficiency commonly go unseen, even by physicians.

Some scientists objected on the ground that the program was not

needed in our well-fed country; others on the ground that more was needed than the program could provide. Doubts were thus created, and as time passed, interest waned. Recently, the attitude of many who were formerly warm supporters of the program, has been one of rather passive acquiescence, with little active faith in the public-health advantages.

Newfoundland Experiment Convincing

In Newfoundland, however, we have had a demonstration of the value of enrichment—a value which everyone can recognize. Here is an experiment in nutrition with conditions controlled, as demanded by the scientist, yet on a scale large enough to be impressive to the layman.

In 1944, a nutrition survey of the people of Newfoundland, requested by the Government of that country, revealed that malnutrition in regard to vitamin A, thiamin, riboflavin, niacin, and ascorbic acid was common.[1] These deficiencies were found in association with extensive dental caries, poor muscular development, and infant mortality. Tuberculosis rates were from two to three times as high as those encountered in populations of similar ancestry in more favored regions.

The war of 1939-45 led to a prosperity unparalleled in the history of the country. The improving economic status, which was only just apparent in 1944, was obvious in 1948. Imports of food increased. And between 1944 and 1948 a number of corrective dietary measures were instituted.

Increased emphasis was placed on education in nutrition; the majority of schools distributed dry milk and cod liver oil; orange juice was distributed to nursing mothers and infants; margarine was fortified with vitamin A; wheat flour was enriched with thiamin, riboflavin, niacin and iron, and, after January, 1947 with bone meal.

Improvement in Nutritional Status

Then in 1948, the group of investigators—the same physicians, with two exceptions—returned to Newfoundland and conducted a resurvey in the same season and, generally, in the same localities that were studied before.

A total of 868 persons were examined in each survey (see Table I). A feature of this study, which probably is unique in nutrition investigations, is that 227 individuals examined in 1944 could be reexamined by the same examiners four years later (Table II).

The 1948 clinical examination revealed a striking decrease, compared with 1944, in the incidence of those abnormalities produced by a deficiency of vitamin A or of one or more of the B vitamins. The incidence of dry, staring (bristling) hair, of roughening of the skin due to hyperkeratosis of the hair follicles, and of thickening and opacity of the conjunctiva over the white of the eye—all signs found in vitamin A deficiency—was strikingly decreased.

Angular stomatitis (cracking and fissures at the angles of the mouth) and cheilosis (abnormal degrees of fissuring and chapping of the lips), both associated with riboflavin deficiency, were encountered much less frequently. The incidence of magenta-colored tongues and of tongues with enlarged or abnormally small papillae, signs frequently associated with a deficiency of niacin, was lowered to a third or less of that observed before.

Marked Reduction In Other Deficiencies

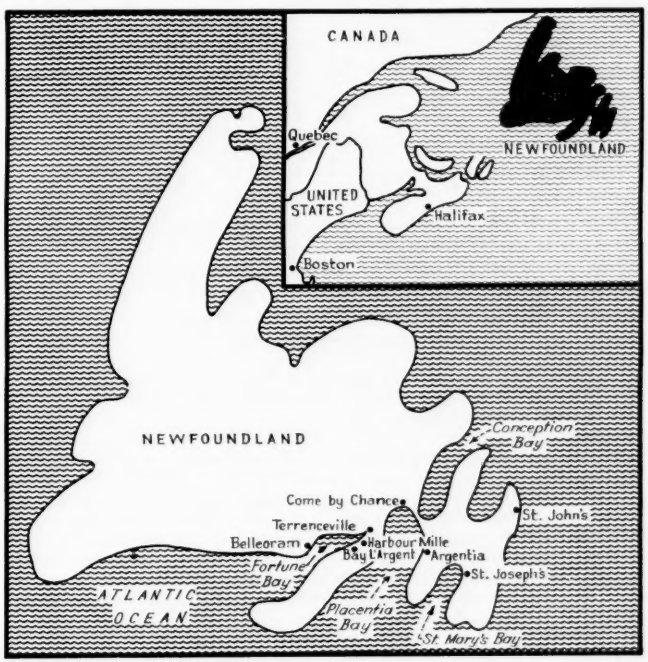
Clinically measurable signs attributable to deficiency of thiamin, were encountered infrequently in both surveys. However, other abnormalities, for which lesser degrees of deficiency of thiamin may have been responsible, were less in evidence in 1948 than in 1944. This applies especially to dyspepsia, constipation, listlessness and apathy.

A number of other abnormalities frequently observed among malnourished people, and of common occurrence in Newfoundland in 1944, were found to be less frequent in 1948. These include: Suborbital pigmentation (darkening of the skin below the eyes), decreased in incidence from 16.5 to 1.7 percent; telangiectases (dilation of skin capillaries), decreased from an incidence of 10.7 to 0.9 percent; congestion of the blood vessels about the cornea of the eye, decreased from 46.4 to 23.2 percent; and blepharitis (inflammation of the eyelids), decreased from 24.3 to 10.8 percent.

It is of interest that the diet in Newfoundland was found to be adequate with respect to calories both in 1944 and in 1948. Nutrition in regard to protein, iron, calcium and vitamin D also appeared to be fairly satisfactory, insofar as could be determined by clinical examination, and by checking serum protein levels, blood hemoglobin and phosphatase content. Signs of rickets were infrequently encountered.

Ascorbic Acid Deficiency

Not all types of abnormalities observed in 1944 had improved by 1948. Those for which a deficiency of ascorbic acid is thought to play a part has actually increased in prevalence. Thus, in 1944, 41 percent of the persons examined had abnormal degrees



NEWFOUNDLAND was ideal for this large-scale experiment in nutrition. Map shows island's location, off coast of Canada, the survey center of St. John's and outlying ports covered in the two clinical investigations.

[1] Data on nutritional deficiencies taken from *Resume of Medical Resurvey of Nutrition in Newfoundland*, by W. R. Aykroyd, N. Jolliffe, O. H. Lawry, P. E. Moore, W. H. Sebrell, R. E. Shank, F. F. Tisdall, R. M. Wilder and P. C. Zamecnik.

These Figures Tell the Story of Better Health

TABLE 1—SIGNS OF MALNUTRITION Resulting from Deficiencies of Vitamin A, Riboflavin, Niacin and Thiamin, Decreased Markedly When Margarine and Flour Were Fortified.

Clinical Findings for All Persons Examined in Newfoundland

	Outlying Ports		St. John's		Total		
	1944	1948	1944	1948	1944	1948	Difference[1]
Number of Persons Examined	599	474	269	394	868	868	1948–1944
Signs of Abnormality	Percent		Percent		Percent		Percent
Hair:							
Dry staring	11.4	1.7	7.4	3.6	10.1	2.5	− 7.6
Skin of Body and Limbs							
Xerosis	4.3	7.6	0	3.0	3.0	5.5	...
Mild follicular changes	43.2	23.6	25.6	19.0	37.7	21.5	−16.2
Follicular keratosis	6.2	7.6	1.1	3.3	4.6	5.6	...
Perifolliculosis	2.0	9.9	1.9	2.5	2.0	6.6	+ 4.6
Crackled skin	2.7	1.9	0.4	0.3	1.9	1.2	...
Skin of Face							
Folliculosis	9.9	3.4	2.2	1.0	7.5	2.3	− 5.2
Dyssebacia	5.5	4.9	3.3	1.5	4.8	3.3	...
Sub orbital pigmentation	15.3	2.3	19.4	1.0	16.5	1.7	−14.8
Telangiectasis	13.6	1.3	4.5	0.5	10.7	0.9	− 9.8
Eyes							
Thickening of conjunctiva, all grades	79.3	75.1	74.9	36.3	76.6	57.5	−19.1
Hyperæmia, all grades	48.5	29.5	42.0	15.5	46.4	23.2	−23.2
Blepharitis, grade 1	20.0	11.6	13.2	6.1	18.0	9.1	− 8.9
grade 2 and greater	7.3	2.3	4.1	1.0	6.3	1.7	− 4.6
Lachrymation	8.4	11.0	2.9	8.1	6.2	9.7	...
Photophobia	8.4	10.5	3.7	8.4	6.8	9.6	...
Lips							
Angular stomatitis	24.7	12.4	16.3	6.3	21.7	9.7	−12.0
Cheilosis, grade 1	41.0	39.2	45.1	34.0	42.2	36.9	− 5.3
grade 2 and greater	32.6	7.6	11.5	4.6	26.2	6.2	−20.0
Gums							
Red hyperæmia, grade 1	25.2	33.3	26.8	38.1	25.8	35.5	+ 9.7
grade 2 and greater	18.2	18.6	7.1	8.6	14.8	14.1	...
Blue congested[2]	7.8		3.3		6.5		...
Swollen	46.1	55.9	42.0	49.7	45.2	53.1	+ 7.9
Interdental papillæ lost	21.7	18.1	16.3	10.4	20.2	14.6	− 5.6
Recession	53.9	31.4	47.2	23.4	52.2	27.8	−24.4
Retraction	25.9	22.6	14.9	14.7	22.6	19.0	...
Pus	14.4	8.9	8.9	4.1	12.7	6.7	− 6.0
Teeth[3]							
Malocclusion, severe	19.4	20.3	21.2	19.3	20.0	19.8	...
Active caries, severe	59.6	74.9	65.6	72.8	61.4	74.0	+12.6
Loss of teeth, moderate[4]	16.7	21.1	27.2	16.5	20.1	19.0	...
marked or complete[5]	20.4	45.6	12.3	25.9	17.8	36.6	+18.8
Tongue							
Reddened	7.7	3.8	1.8	0.8	5.8	2.4	...
Magenta	10.9	0.6	8.9	0	10.2	0.3	− 9.9
Swollen	7.1	1.5	0.4	0.5	4.9	1.0	...
Hypertrophic papillæ tip	13.2	17.5	14.5	11.7	13.7	14.9	...
tip and elsewhere	19.3	7.0	24.9	8.7	21.1	7.7	−13.4
Atrophic papillæ tip	15.4	4.4	10.4	3.0	13.9	3.8	−10.1
tip and elsewhere	21.0	6.7	12.6	1.8	18.4	3.9	−14.5
Fissuring, severe, multiple	11.2	11.8	4.8	3.9	9.2	8.1	...
Muscles							
Poor development, winged scapula	9.6	9.3	12.6	7.1	10.5	8.3	...
Neurologic signs							
Absent knee and ankle jerks	2.3	1.3	0.7	1.3	1.8	1.3	...
Loss of vibratory sense							
Toes	4.0	7.0	0.3	2.8	2.9	5.1	...
Malleoli	1.5	2.7	0	1.0	1.0	2.0	...
Tibiæ	0.8	1.3	0	1.0	0.6	1.2	...
Tender calf muscles	2.3	1.7	1.1	0.3	2.0	1.0	...
Squatting test[6]	0.8		0.4		0.7		

[1] Figures preceded by a minus sign, represent statistically significant improvements in 1948 as compared with 1944. Figures preceded by a plus sign represent worsening in same period. Three dots indicate that difference is without statistical significance.
[2] Examination for blue congestion of gums was not made in 1948.
[3] Caries and loss of teeth, so prevalent in 1944, were similarly prevalent in 1948.
[4] Teeth lost, 4 or less.
[5] Teeth lost, 5 or more.
[6] Results of squatting test not recorded in 1948.

of reddening of the gums and 45.2 percent showed abnormal swelling of the gums, types of lesions which may result from ascorbic acid deficiency. Both of these lesions were more prevalent in 1948.

Active dental caries and loss of teeth, very serious problems in Newfoundland, also increased in incidence in 1948. Analysis of blood and urine for several nutrients gave information about the adequacy of the diets. Comparison of the chemical data of 1948 with those of 1944 showed little change in hemoglobin or serum protein, and a small decrease in serum ascorbic acid. In contrast, there were dramatic increases in the excretion of thiamin and riboflavin, and in the level of vitamin A in the blood serum.

Listlessness and Apathy Gone

The people encountered in 1948 were better dressed than they were in 1944, and their homes appeared to be better tended. Of more significance was the increased alertness of the persons examined. Gone to a great extent were the apathy and listlessness so noticeable in 1944. The children no longer waited patiently for their examinations. They clustered around the tables of the examiners unless they were shooed away. More monitoring was required. They were interested and curious, as children ought to be. They swarmed over the decks of the motorboat when it docked at the outlying ports and had to be herded off. They engaged in games and play, whereas the absence of play had been remarked upon in 1944.

The quality of life had improved in Newfoundland. So, too, to judge by such criteria as mortality rates, had the quantity of life. The reported death rate from all causes fell from 12.1 to 10.5 per thousand of the population. The number of deaths from tuberculosis decreased sharply, and the rate of still births and of deaths of infants less than 1 year of age was strikingly reduced.

Economics Not a Factor

Other things occurred which may have influenced the nutrition of the population and with it the public health. Much more money was available, and could have purchased more or better food. Data indicate that this was not the case, however, for not all outward signs of malnutrition had decreased. Only those had lessened which could have been affected by addition of vitamin A to the margarine and of riboflavin, niacin and thiamin to the flour. There was no improvement, indeed, a worsening, with respect to the prevalence of lesions relatable to deficiency of vitamin C.

Chemical analyses of the blood and urine of the people told the same story: Improvement with respect to vitamin A, niacin and riboflavin, probably also with respect to thiamin; no change or even worsening with respect to vitamin C. The people simply hadn't bought more fruits and vegetables. Had they done so, the values for vitamin C in their blood would have shown it.

Some increase in imports of processed fruits and vegetables was offset by diminished home production. More milk was procured in cans, but less was produced in many outlying ports, with a net effect of questionable importance. In any case, increased purchase of processed fruits and vegetables and of milk and meat was relatively small. Much of the increase was probably consumed by the military forces on the island. The only food category for which increased consumption was clearly evident was that of sugar, jams and candy. From the qualitative point of view, this could not have helped the nutritional condition of the people.

The program of public education in nutrition, and the distribution of skim milk, cod liver oil and concentrated orange juice, could have had but little effect, for otherwise the urines would have shown more vitamin C and outward signs of vitamin C deficiency would have lessened. We thus inevitably must give the principal credit for the improvements observed in New-

foundland between 1944 and 1948 to enrichment of the flour and fortification of the margarine.

Lesson for Us

Now what does all this mean for us —spelled "U. S."—reputably the best-fed people in the world, with vitamins to spare? In point of fact, the foods consumed per head from 1935 through 1939 (before enrichment) provided little in the nature of a margin of safety with respect to the vitamins, thiamin, riboflavin and niacin, and the minerals, iron and calcium.* No liberal provisioning applied to vitamin C, vitamin A, protein and food energy. Shortly after 1941, however, the food consumed per head did provide the necessary factor of safety for thiamin, riboflavin, niacin and iron—thanks mainly to enrichment of the bread and flour.

In most areas of the United States in the period 1935 through 1939 malnutrition undoubtedly was less than that in Newfoundland. Even so, almost every U. S. survey showed that many persons were involved. Furthermore, individuals may be affected severely by malnutrition even when the general incidence is low. For example, in hospitals in New York City, it was not unusual to encounter beri beri and pellagra. But by 1943, in Dr. Jolliffe's wards at Bellevue Hospital, these severe nutritional diseases which result from lack of thiamin and niacin had disappeared.

Vitamin C Deficiency Here Too

In New York City, as in Newfoundland, the improvement was unaccompanied by any lessening in abnormalities related to lack of vitamin C, which led Dr. Jollife to attribute its specifically to enrichment of the bread, and not to a general improvement in the diet, made possible by greater income.

The same probably can be said about the pellagra of our southern states. This disease, formerly very prevalent in that region, has almost disappeared in recent years. The betterment has been attributed to war prosperity and the purchase of better food by the inhabitants. But the Newfoundland experience prompts me to question that interpretation, and to give the credit for the change to enrichment of the flour and corn meal.

What is good for Newfoundland is also good for us. White flour and refined corn meal furnish together a relatively enormous proportion of the calories of the diets of the less privileged sections of the population. Enrichment of these calories with niacin, riboflavin and thiamin, provides a way of immediately correcting the principal shortcomings of such diets, as was shown in

* Esther Phipard and Hazel K. Stiebeling: "Adequacy of American Diets." *Journal of the American Medical Association*, 139:579-85 Feb. 26, 1949.

Analysis Gives Further Proof of Trend

TABLE II—WHEN SAME PERSONS WERE RE-EXAMINED In 1948, Lessening of Malnutrition was Similar to that of the Entire Test Group.

Clinical Findings of 227 Persons Examined in 1944 and Re-Examined in 1948[1]

Signs of abnormality	1944 Percent	1948 Percent	Difference[2] 1948–1944 Percent
Hair			
Dry, staring	8.4	1.8	− 6.6
Skin of Body and Limbs			
Xerosis	2.6	8.4	...
Mild follicular changes	35.7	25.0	−10.7
Follicular keratosis	5.3	7.0	...
Perifolliculosis	1.3	12.3	+11.0
Crackled skin	1.8	2.6	...
Skin of face			
Folliculosis	7.9	3.5	...
Dyschacia	4.4	5.7	...
Suborbital pigmentation	7.0	2.2	...
Telangiectasis	1.3	0	...
Eyes			
Thickening of conjunctiva, all grades	77.1	79.3	...
Hyperæmia, all grades	51.5	27.8	−23.7
Blepharitis, grade 1	21.6	12.3	...
grade 2 and greater	9.7	0.9	− 8.8
Lachrymation	8.4	12.8	...
Photophobia	9.3	14.1	...
Lips			
Angular stomatitis	17.2	10.6	...
Cheilosis grade 1	44.9	42.3	...
grade 2 and greater	26.0	7.5	−18.5
Gums			
Red hyperæmia, grade 1	24.2	37.0	+12.8
grade 2 and greater	15.0	13.2	...
Swollen	41.4	54.6	...
Interdental papillæ lost	17.2	15.4	...
Recession	52.0	29.5	−22.5
Retraction	24.2	18.1	...
Pus	10.1	7.5	...
Teeth			
Malocclusion, severe	20.7	22.4	...
Active caries, severe	62.6	70.1	...
Loss of teeth, moderate	12.3	22.5	+10.2
marked or complete	26.4	44.1	+17.7
Tongue			
Reddened	3.5	2.2	...
Magenta	9.7	0	− 9.7
Swollen	4.8	2.2	...
Hypertrophic papillæ tip	26.4	20.7	...
tip and elsewhere	25.1	10.1	−15.1
Atrophic papillæ tip	31.7	4.4	−27.3
tip and elsewhere	29.1	5.7	−23.4
Fissuring, severe, multiple	8.8	11.0	...
Muscles			
Poor development	15.9	13.2	...
Winged scapula	14.5	9.7	...
Neurologic Signs			
Absent knee jerks	0	3.1	...
Absent ankle jerks	1.8	5.7	...
Loss of vibratory sense			
Toes	1.3	7.9	+ 6.6
Malleoli	1.3	4.0	...
Tibiæ	1.3	1.8	...
Tender calf muscles	2.2	2.2	...

[1] Persons examined in outports 190; in St. John's 37.
[2] See footnote [1] of Table I.

Newfoundland. As also shown there, however, a brief increase in money income, even when accompanied by nutrition education, may not affect improvement of the diets.

Other Vitamins Needed

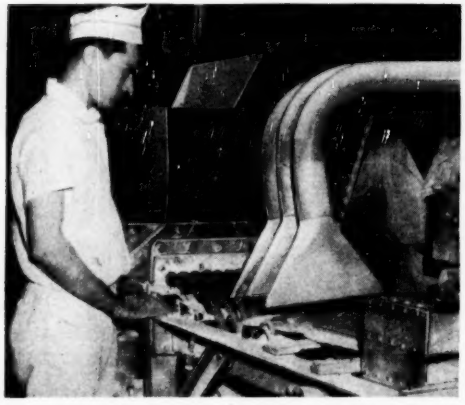
We do not wish to leave the impression that the enrichment program has completely solved the problem of nutrition in Newfoundland, or anywhere. As a first step, it has proved extremely beneficial in Newfoundland. Even so, the quantity and quality of life in Newfoundland leaves much to be desired.

The lesions attributable to deficiency of vitamin C remain to be corrected. And diet improvements in respect to vitamin C, and in other respects, are undoubtedly required. The final answers to the problems of nutrition, in Newfoundland as elsewhere, depend on education, which in turn must be combined with either long-term maintenance of a reasonably high standard of living, or with some provision, other than that accomplished by money income, whereby foods can be distributed in response to needs.

The above article is based on paper, "Recent Nutritional Surveys of Newfoundland; Significance of Findings," presented by author at Conference on Recent Nutritional Surveys in Newfoundland, held at Hotel Biltmore, New York City, April 4, 1949.

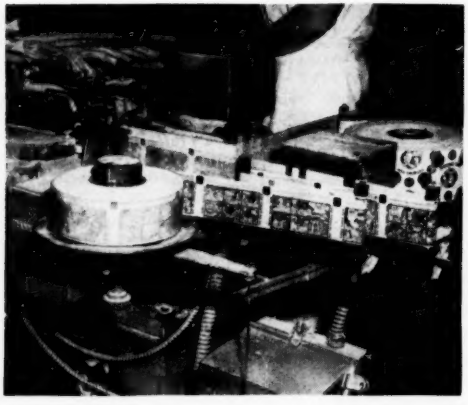
BUBBLE GUM: From the Mix to the Final 1-Cent Package

1 **MIXER** is tilted to pour 800-lb. batch of gum base into large trough on tote truck, which is later rolled to filter. Then, the filtered gum base is blended with corn syrup, powdered sugar, and flavor to produce the bubble gum.



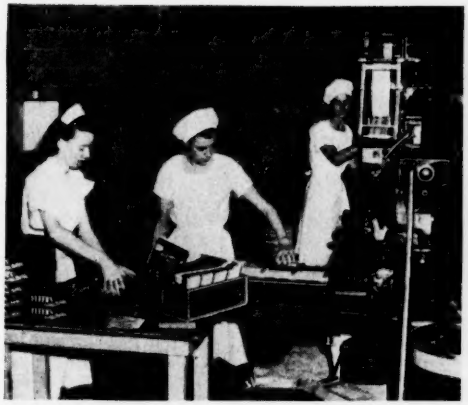
2 **EXTRUDER**—5,000 lb. per hr. capacity—forms gum into ropes. Detector (lower right) spots stray metal.

3 **SEALING IRON** welds ropes into continuous strand, which is then fed into kiss-wrapping machine (left).

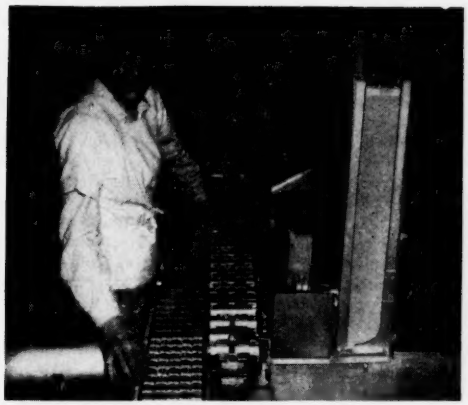


4 **CARTOONS** are registered by electric-eye unit as they are fed to kiss wrapper together with outerwrap.

5 **SIGNAL BOARD** indicates to kiss-wrap operators size and condition of wrap going to packing department.



6 **CARAMEL WRAPPER** is designed to square-wrap 500 pieces a min. Electric eye registers double wrapper.



7 **SPECIAL UNIT** puts five square-wrapped pieces on cardboard boat, and overwraps package with cellophane.

What It Takes to Make Quality Penny Items at a Profit

Volume output, with fewer rejects, is achieved by Fleer's labor-saving machines that wrap up to 500 pieces of bubble gum a minute

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

To the youngster, the popping of bubble gum is the acme of simple pleasure. But to the manufacturer, the penny confection is a very serious—and exacting—business. He must constantly keep on his toes to make sure that the popping is all in the gum—and not in his processing lines.

With the youngsters demanding an extra large piece of attractively wrapped gum, plus such premiums as cartoons and fortunes, costs can easily get out of hand, especially when the gum retails for only a penny. So it has to be a big-volume, efficiently run business.

It is definitely that at Frank H. Fleer Corp. of Philadelphia, where almost 100,000 lb. of bubble gum is produced daily. And here is how this firm has hit the target in the bubble gum business:

1. Advanced manufacturing methods are being used and the newest equipment has been adapted—even redesigned—to the company's needs.

2. A well-organized staff keeps production running smoothly, constantly looks for ways to pare operating costs, and uses department teamwork in tackling problems.

3. Management continually is improving personal relations in order to increase production, to maintain quality products, and to make duties of the workers less difficult.

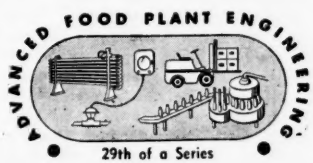
High working efficiency, economy and quality are attained in the base-making, mixing, extruding, wrapping and packing departments.

Making the Gum Base

First, let us see how these improvements are accomplished in the base-making department. Pallet-loads of raw base materials are transported to this department by fork-lift truck. Double-blade, steam-jacketed mixing kettles are tilted to pour these ingredients—preweighed—into the mixers where they are blended.

After 800-lb batches of chewing gum base are mixed, the kettles are tilted again to empty the gum base into large troughs on tote trucks. The base is hauled to a hydraulic filter which has stainless steel screens to remove possible foreign matter. After being pumped through the filter, the base is again collected in stainless steel troughs on tote trucks.

Next, we come to the final-mixing department. Here, 900-lb. batches of gum are prepared in double-blade, steam-jacketed mixing kettles. Batches containing filtered gum base, plus corn syrup, powdered sugar, and flavor, are mixed for about 12 minutes. The gum is removed from the mixers onto tables, where it is cut up into 50-lb. sections. These are gravity-fed by chute to the forming department on the floor below.



Steps to Improve Mixing

Two innovations in the mixing department have resulted in new efficiency, economy and quality. These developments are technies employed in the addition of flavor and powdered sugar to the mixers.

First, a proficient method of adding flavor to the mixers has been devised. Formerly, the required amounts of flavor for each batch were weighed by the laboratory into separate containers. Now, the flavor from the storage tank is piped into a specially designed stainless steel measuring vessel. This vessel has overflow holes, at a predetermined depth, to control quantity of flavor which it holds. As a result of this installation, it is no longer necessary to weigh flavor for each batch or carry and pour it. Also, losses due to spillage are avoided.

Second, instead of using commercial powdered sugar, which sometimes becomes lumpy and must therefore be

sifted, the company puts granulated sugar through a micropulverizer immediately before adding it into the mixers. The micropulverized sugar is in a fluffy condition, and when used in this state, a better and more uniform gum can be made. The unit grinds 3,000 lb. of sugar an hour to specifications that call for 80 percent through 200-mesh sieves and 98 percent through 100 mesh.

Metal Detector Installed

Now to the extruding department: Here, higher quality and increased production rates are achieved through use of a metal detector on the extruding machine. This detector is an electronic device that inspects the ten pencils or "ropes" of bubble gum leaving the extruder. Metal particles with a spherical diameter as low as 0.039 in. can be spotted—no matter how deeply they may be buried in the gum under inspection.

The detector consists of two box-like heads that are separated by two plastic spacer blocks to form an opening—the inspection aperture. Gum leaving the extruder is passed through the inspection aperture. Here, it is continuously screened by a high-frequency electro-magnetic field set up by coils imbedded in the plastic panels. If metal is present in the product, a reaction takes place which actuates an interlock that stops the extruder and the conveyor. Gum containing the metal is immediately rejected, the operator cutting out a short section of each extruded "rope" between two markers on the machine.

The bubble gum extruder operates at the rate of 5,000 lb. an hour. Ten ropes of gum, each of 1¼-in. dia., are formed simultaneously. Leaving the extruder, the ropes travel by canvas-belt conveyor through the electronic metal detector to the automatic guillotine that cuts them to lengths to fit boards. The boards are then placed on metal racks, where the gum is permitted to "condition", so that it can easily be formed, cut, and wrapped.

Kiss-Wrapped at 220 a Minute

Most striking improvements are in the wrapping department. Emphasis is on high-speed wrapping, with fewer rejects on the kiss- and square-wrapping lines. Here is how fast-wrapping is accomplished on the kiss-wrap line:

Lengths of bubble gum are joined into a continuous strand and fed into the machines, which form the confection to a cylindrical shape and cut it to proper length. Simultaneously, papers (cartoon and outer wrapper) are fed from two rolls, cut, and wrapped together over the gum by twisting both ends of cartoon and outer wrapper. The kiss-wrapped gum then drops through a chute onto a canvas belt-conveyor that carries it to the packing department.

Single registration for the comic cartoon is accomplished by an electric eye. Speed of each machine is 220 a min.

More than double the wrapping speed—500 a min. per machine—is achieved on the square-wrap line. Forgrove type of caramel wrapping machines, equipped with electric eyes, for double registration (width and length) of both the cartoon and the outer wrapper, have been redesigned and adapted to meet the company's needs.

In accomplishing such a high speed, the modified caramel wrapper: (1) forms the gum to correct shape (2) cuts it to proper length, (3) feeds paper from a roll, (4) splits paper into two halves—cartoon and outer wrap, (5) folds the cartoon (6) cuts cartoon and outer wrap at scoring point, (7) wraps two pieces of paper around the gum, (8) tucks ends of wrappers, and (9) heat-seals wrappers.

A conveyor takes square-wrapped gum, single file, to a 5-count selector. As the timed selector revolves, it picks off 5 pieces of gum and transfers them to the pack-off conveyor, which is at right angles to the conveyor leaving the wrapping machine.

At the end of the pack-off conveyor, an operator picks up 25 pieces of gum with a metal paddle and packs them into cartons—4 layers of 25 pieces of gum to a carton.

The newest 5c.-package consists of 5 pieces of square-wrapped gum on a cardboard boat, automatically cellophane overwrapped and heat-sealed. The nickel package-wrapping machine is synchronized to operate with the caramel wrapper—100 of the 5c. packages a min.

Signal System Cuts Rejects

Finally, let us see what improvements there are in the packing department. The number of rejects has been materially cut down on the kiss-wrap line through a signal system. This system has been set up for the quality control inspectors to tip-off kiss-wrapper operators regarding the condition of the gum being conveyed to the packing department.

Electric signs flashed on a board in front of the operators read: "Good Wrap," "Register (difficulty with registration)," "Small Gum," "Unwrapped," and "Open Ends." There is a red light to illuminate the particular sign which applies to the condition of the operation at any time.

After leaving the inspector, kiss-wrapped gum goes to the packing station, where the individual pieces of gum are packed into boxes. Next, the boxes are conveyed to the weighing station, where they are counted by weight—100 pieces per box. Inserts are added and boxes are lidded and semi-automatically sealed with Scotch tape. Boxes are then packed 24 to a case. And cases are finally automatically glued and sealed.

Boxes containing 100 square-wrapped pieces of gum are carried on pallets by fork-lift truck to the packing department. The boxes are then machine-wrapped with wax paper—rate 60 per min. Corrugated cardboard sleeves are placed over the boxes before they are packed 24 boxes to a case. Cases are then automatically glued and sealed.

Nickel square-wrapped packages are packed in display boxes—20 packages to the box. The boxes are packed 24 to case. And cases are finally automatically sealed and glued.

Good Organization Wins the Battle

The struggle to keep production expenses down, as labor, materials, and distribution costs rose, has been met by the manufacturing department. And the battle would not have been won unless the manufacturing department was organized so that key responsibilities could be assigned to personnel capable of handling them.

The manufacturing department, under supervision of Plant Superintendent W. E. Diemer, specifically operates to keep production running smoothly, according to this program: (1) Problems relating to plant layout and to doing a job efficiently are tackled by a methods engineer and his two assistants; (2) installation, maintenance, and alteration of building and equipment are the responsibilities of the plant engineer; (3) hourly wage rates, determined through job evaluation and a plan of wage incentives, are set up by a wage and cost engineer; and (4) production is directed by the general foreman.

The manufacturing department works closely with sales, and strives to pass on all savings in production costs to the sales department. With these savings, the sales department builds up its merchandising structure—strengthens its position in the market through further promotional activities and additional product values.

Value of Supervisory Meetings

Another step taken to keep production going smoothly is the supervisory discussion meetings set up by N. P. Hutson, company president. These meetings, held every other week, are attended by key personnel of the production, sales, accounting, research, and purchasing departments.

Purpose is to coordinate the opera-

(*Turn to page* 182)

C-RATIONS stood the test. Exposed eight years in "Food Industries" office, products were unchanged. Cans were satisfactory except for slight gas bulges—not microbial—on the ends of some cans of meat-and-vegetable stews and hash.

Army Tests Reveal How Storage Affects Canned Meat Flavor

Most foods were acceptable after a year. But interiors of many cans were altered, in some cases discoloring the products. Enamel-lined cans are advised to improve the appearance and organoleptic stability of the various meat items

B. W. GARDNER, JR.
Quartermaster Food & Container Institute
For the Armed Forces, Chicago

Data gathered in Army studies on storage of the various new canned meats developed during World War II are seen of broad interest, since many of these products are now going to civilian markets.

The research, conducted by the Quartermaster Food & Container Institute for the Armed Forces, was for the purpose of determining those products that might not hold up long enough in storage to justify retaining them as Army rations.

Although this research was designed for military purposes only, the findings summarized in Table I have civilian value in that the housewife's acceptance of these canned products depends upon their flavor-quality. The results should be of particular interest to both the packers and the wholesale purchasers of large quantities of canned meats and meat products—since these products, packed for civilian consumption during the periods of heavy marketing of meat animals are put up in storage prior to being sold during the seasons when marketing of animals is light and prices are higher.

Military studies on canned meat products have been limited because of the few types of meat items used by the Armed Forces prior to World War II. The commercial shelf life of these few prewar items was satisfactory for one to two years. However, during World War II many new canned meat products were developed and some have been introduced to the civilian market without sufficient previous factual evidence bearing on how well their flavor qualities will be retained under warehouse, market and consumer storage conditions.

Effects of storage upon the flavor quality of canned meats and meat products and upon the interior surfaces of cans are detailed in a report compiled by the QF&CI.*

How Tests Were Made

Samples of canned meats and meat products were obtained from various manufacturers and taken from the same run of ingredients or from the same retort basket so that they would be as nearly identical as possible. The items were formulated and processed according to definite specifications (CQD Tentative Specifications in effect at that time) and were standard items of large-scale production. Studies of these samples began within thirty days after packing.

Tests were carried out at room temperature (72 deg. F. ± 10 deg.), and also at 100 deg. F. Storage at 100 deg. F. simulated the severe conditions experienced by the Armed Forces overseas. Under both temperatures, storage periods ranged from 60 to 360 days, with examinations at 60-day intervals. All organoleptic tests and comparisons for appearance were made by the same personnel in order to avoid discrepancies.

Flavor changes were determined organoleptically so as to simulate the test by which the consumer determines the acceptability of a canned meat product. General comparisons for the appearance of cans and products were made at the same 60-day intervals that the organoleptic tests were made.

Changes in the appearance of the internal surfaces of the cans (as summarized in Table II) are of interest because of possible effect on flavor of contents. Other changes are swelled or bulged cans resulting from pressure of hydrogen gas. These potential "hydrogen swells" are not to be confused with swelled or bulged cans resulting from microbial gas developed in enamel-lined cans or unlined cans which show no deterioration on their internal surfaces. The comparisons for appearance were made to determine the advisability of packing the various products in enamel-lined cans.

The pH of each product was recorded initially to show possible relationship to the stability of the products.

Numerical Yardstick

Arbitrary numerical values were used to express changes occurring in the products and in the cans. A numerical rating of 4 and 5 in Table I indicates product deterioration to the extent of being undesirable for use. The changes in the interiors of the cans were also given arbitrary numerical values. Numerical ratings of 5 and 6 in Table II indicate sufficient change to affect the general

* "An Organoleptic Evaluation of the Keeping Qualities of Army Canned Meats Before and After Storage," Interim Report No. 1, Project No. 7-84-06-22, Q. M. Food & Container Institute for the Armed Forces, Research and Development Branch, OQMG.

appearance and organoleptic acceptability of the product.

During storage, it was observed that the interiors of many cans were altered. In some instances, changes occurred which discolored the product itself and contributed to unacceptability. In general, the products in enamel-lined cans had a better appearance than those which were put up in unenameled cans. Ham with candied sweet potatoes and pork sausage links showed extensive changes in the interiors of the unenameled cans. Use of enameled cans for these products would be advisable to improve their appearance and acceptability.

Organoleptic tests show that ham with raisin sauce was not acceptable after one year's storage, either at 100 deg. F. or at room temperature. Dehydrated meat and rice and dehydrated corn beef hash showed evidences of deterioration and reduced palatability at the end of the year.

Although chili con carne, frankfurters, ham chunks, ham and lima beans, pork and apple sauce, pork and beans, pork and gravy, and pork and rice were acceptable after one year, an improvement in their appearance and organoleptic stability, especially for storage at high temperatures, would be effected if these products were put up in interior-enameled cans.

The above paper, reporting research undertaken by the Quartermaster Food & Container Institute for the Armed Forces, has been assigned No. 246 in the series of papers approved for publication. The views or conclusions contained in this report are those of the author. They are not to be construed as necessarily reflecting the views or indicating endorsement of the Department of the Army.

Data Disclose Conditions of Foods and Cans at Different Storage Intervals

TABLE I—Flavor Changes in Products During Storage at Room Temperature (72 deg. F. ± 10 Deg.) and at 100 Deg. F.

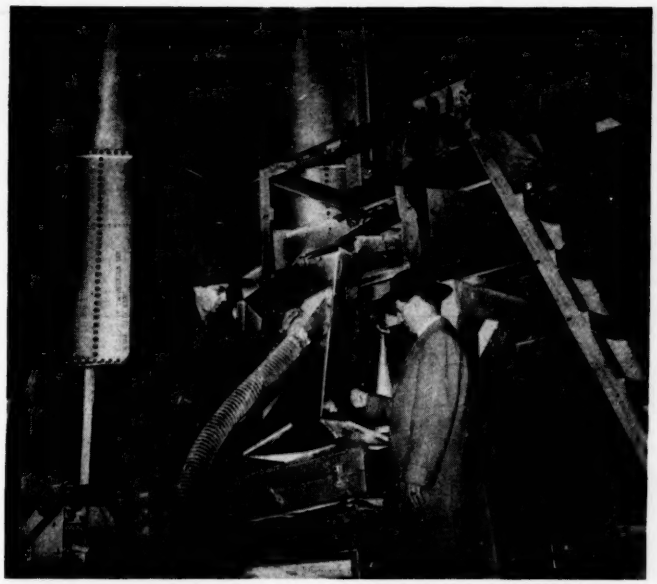
Changes are expressed as degree of deterioration: 0, no change; 1 and 2, slight change; 3 and 4, moderate change; and 5 and 6, extreme change. pH values are average determinations made on unstored samples.

Item	pH Values	Storage Temperature	Control Quality	Degree of Change After Storage, Days					
				60	120	180	240	270	360
Beef & pork loaf	6.00	Room temp.	.....	0	0	0	0	0	0
		100 deg. F.	.....	0	0	0	1	...	1
Beef & vegetables	5.75	Room temp.	Very	0	0	0	2	2	3
		100 deg. F.	good	0	0	0	2	2	3
Chili con carne	5.40	Room temp.	Very	0	1	1	1	1	2
		100 deg. F.	good	0	1	1	1	1	3
Chopped pork & eggs	6.55	Room temp.	Medium	0	0	0	1	2	2
		100 deg. F.		0	0	0	1	3	3
Corned beef hash	5.65	Room temp.	Very	0	0	1	1	2	2
		100 deg. F.	good	0	0	1	2	3	3
Dehydrated corned beef hash	5.90	Room temp.	Good	2	2	3	4	4	4
		100 deg. F.		1	2	3	3	4	5
Frankfurters	6.15	Room temp.	Poor	0	0	0	1	1	3
		100 deg. F.		0	1	1	2	2	5
Frankfurters & beans	5.85	Room temp.	Good	0	1	1	1	1	1
		100 deg. F.		0	0	0	0	1	2
Meat balls & spaghetti	5.50	Room temp.	Good	0	0	0	0	3	4
		100 deg. F.		0	1	1	1	3	4
Ham with candied sweet potatoes	6.75	Room temp.	Fair	0	1	1	1	1	1
		100 deg. F.		0	1	2	2	2	4
Ham chunks	6.10	Room temp.	Very	0	0	0	0	0	2
		100 deg. F.	good	0	0	2	3	3	3
Ham & eggs	6.45	Room temp.	Very	0	1	1	2	2	2
		100 deg. F.	good	0	1	1	1	1	3
Ham & eggs & potatoes	6.45	Room temp.	Medium	0	0	0	0	1	2
		100 deg. F.		0	0	2	3	4	6
Ham & lima beans	6.00	Room temp.	Very	0	0	0	0	0	1
		100 deg. F.	good	1	2	2	3	3	3
Ham with raisin sauce	5.25	Room temp.	Good	0	0	0	2	2	6
		100 deg. F.		0	1	1	6	6	6
Hamburgers	6.15	Room temp.	Excellent	0	2	2	3	3	3
		100 deg. F.		0	2	...	3	3	3
Meat & beans	5.45	Room temp.	Fair	0	1	1	1	1	2
		100 deg. F.		0	1	2	3	3	3
Dehydrated meat & rice	6.10	Room temp.	Very	1	2	2	2	2	3
		100 deg. F.	good	0	2	3	3	4	6
Meat balls & spaghetti	5.13	Room temp.	Very	0	1	1	1	1	1
		100 deg. F.	good	0	1	1	2	2	2
Meat & noodles	6.30	Room temp.	Poor	0	0	0	1	1	1
		100 deg. F.		0	0	0	1	1	1
Pork & apple sauce	5.45	Room temp.	Very	0	0	0	1	1	1
		100 deg. F.	good	0	...	0	1	2	3
Pork & beans	5.70	Room temp.	Fair	0	0	0	2	2	2
		100 deg. F.		0	0	0	2	3	4
Pork & corn	6.40	Room temp.	Very	0	0	0	0	2	2
		100 deg. F.	good	0	0	0	0	2	2
Pork & gravy	6.25	Room temp.	Fair	0	1	1	1	1	2
		100 deg. F.		0	1	1	2	2	2
Corned pork loaf with carrots & apple flakes	5.90	Room temp.	.....	0	0	0	0	0	0
		100 deg. F.		1	1	2	2	3	5
Pork & rice	6.22	Room temp.	Fair	0	0	0	1	1	1
		100 deg. F.		0	0	0	2	5	4
Pork sausage links	6.20	Room temp.	Medium	0	0	0	3	3	3
		100 deg. F.		0	0	0	4	4	5
Pork sausage meat	6.35	Room temp.	.....	1	2	2	3	3	4
		100 deg. F.		1	1	1	1	3	4
Roast beef	6.10	Room temp.	Good	0	0	0	2	2	3
		100 deg. F.		0	0	0	2	2	3
Vienna sausage	5.75	Room temp.	Good	1	1	1	1	1	3
		100 deg. F.		0	2	2	2	2	3
Vienna sausage, skinless	5.75	Room temp.	Good	0	0	0	1	1	1
		100 deg. F.		0	1	1	2	2	2

TABLE II—Changes on Inside Surface of Cans During Storage at Room Temperature (72 Deg. F. ± 10 Deg.) and at 100 Deg. F.

Changes are expressed as follows: 0, none; 1 and 2, slight discoloration; 3 and 4, moderate discoloration; 5 and 6, extreme discoloration; and 7 and 8, corroded can or discolored product. E indicates enameled can.

Item	Storage Temp.	Initial Examination	Degree of Change After Storage, Days					
			60	120	180	240	270	360
Beef & pork loaf	Room temp.	...	...	...	...	...	...	...
	100 deg. F.	...	...	...	...	...	...	...
Beef & vegetables	Room temp.	1	4	4	4	4	4	5
	100 deg. F.	1	4	4	4	5	5	5
Chili con carne	Room temp.	1	3	5	5	5	6	7
	100 deg. F.	1	3	5	5	5	6	7
Chopped pork & eggs	Room temp.	E-0	E-0	E-0	E-0	E-1	E-1	E-0
	100 deg. F.	E-0	E-0	E-0	E-0	E-0	E-2	E-0
Corned beef hash	Room temp.	E-0	E-1	E-1	E-1	E-1	E-4	E-4
	100 deg. F.	E-0	E-1	E-1	E-1	E-2	E-5	E-5
Dehydrated corned beef Hash	Room temp.	...	...	1	2	...	...	...
	100 deg. F.	...	...	...	3	5	5	...
Frankfurters	Room temp.	1	1	1	1	2	2	2
	100 deg. F.	1	1	1	1	6	6	7
Frankfurters & beans	Room temp.	1	1	1	1	1	1	1
	100 deg. F.	1	1	1	1	1	2	2
Meat balls & spaghetti	Room temp.	1	1	1	1	1	4	4
	100 deg. F.	1	1	2	2	2	4	4
Ham with candied sweet potatoes	Room temp.	1	...	3	3	3	3	3
	100 deg. F.	1	6	3	7	7	7	7
Ham chunks	Room temp.	1	1	4	3	4	4	4
	100 deg. F.	1	1	4	4	8	8	8
Ham & eggs	Room temp.	E-0	E-0	E-0	E-0	E-0	E-0	E-0
	100 deg. F.	E-0	E-0	E-0	E-0	E-0	E-0	E-0
Ham & eggs with potatoes	Room temp.	E-0	E-0	E-0	E-0	E-0	E-0	E-0
	100 deg. F.	E-0	E-0	E-0	E-0	E-0	E-0	E-0
Ham & lima beans	Room temp.	4	4	4	4	4	6	4
	100 deg. F.	4	7	7	8	8	8	6
Ham with raisin sauce	Room temp.	1	1	2	2	2	...	...
	100 deg. F.	1	1	2	3	8	8	8
Hamburgers	Room temp.	...	...	3	2	1	4	4
	100 deg. F.	...	...	3	...	6	6	6
Meat & beans	Room temp.	1	2	3	3	3	3	3
	100 deg. F.	1	2	3	3	3	3	3
Dehydrated meat & rice	Room temp.	...	...	...	1	2	3	3
	100 deg. F.	...	...	...	4	4	4	4
Meat balls & spaghetti	Room temp.	1	4	4	4	5	5	5
	100 deg. F.	1	4	4	4	5	5	6
Meat & noodles	Room temp.	E-0	E-0	E-0	E-0	E-1	E-0	E-0
	100 deg. F.	E-0	E-0	E-0	E-0	E-0	E-0	E-0
Pork & apple sauce	Room temp.	...	...	...	2	3	4	4
	100 deg. F.	...	...	...	2	3	4	4
Pork & beans	Room temp.	...	1	1	1	6	5	5
	100 deg. F.	...	1	1	1	6	6	0
Pork & corn	Room temp.	...	...	...	...	...	...	...
	100 deg. F.	...	...	...	...	1	2	2
Pork & gravy	Room temp.	2	5	7	7	7	7	6
	100 deg. F.	2	5	7	7	8	8	6
Corned pork loaf with carrots & apple flakes	Room temp.	...	...	...	...	...	...	...
	100 deg.	...	...	...	...	...	...	...
Pork & rice	Room temp.	2	2	2	2	2	2	2
	100 deg. F	2	2	2	3	4	6	5
Pork sausage links	Room temp.	...	5	5	5	6	6	6
	100 deg. F.	...	5	5	5	6	6	6
Pork sausage meat	Room temp.	E-0	E-1	E-0	E-0	E-4	E-0	E-0
	100 deg. F.	E-0	E-1	E-0	E-0	E-4	E-0	E-0
Roast beef	Room temp.	...	1	1	1	4	4	6
	100 deg. F.	...	1	1	1	4	4	6
Vienna sausage	Room temp.	2	2	1	1	1	1	1
	100 deg. F.	2	2	1	1	1	1	4
Vienna sausage, skinless	Room temp.	2	2	2	2	2	2	2
	100 deg. F.	2	2	2	2	2	2	2



SPECIAL pilot unit successfully separates sorghum grain components.

Milo Yields To Research

Highly useful industrial materials are recovered by dry milling at new Kansas pilot plant

C. C. ISELY*
Consultant, Dodge City, Kan.

Starch, wax, oil, grits, oil meal and bran—obtained from milo and related grain sorghums by a new method of dry milling—are the potential commercial products to result from the experimental project under way at Dodge City, Kan.

Built by Dodge City Industries, Inc., the experimental plant and its operations are financed by an aggregation of farmers and business men residing in the area extending from Dodge City, Kan., to Plainview, Tex., and to Rocky Ford and Limon, Colo. In all, 50 men put up $85,000 to build the plant and supply working capital.

This is the pilot-plant stage of a forward-looking program to (1) improve agriculture in the High Plains region of the United States, (2) encourage wider crop diversification as a hedge against wheat's becoming a troublesome surplus, and (3) provide new ingredient materials for human foods and additional commodities for poultry and animal feeding and for industrial uses.

For some ten years, Prof. H. N. Barham, industrial chemist at Kansas State College and a nationally known starch chemist, has been delving into wider uses for grain sorghums. He has done a fundamental task in classifying the sorghum starches, has given them significant ratings, and has determined their properties. The results of his studies set in motion the present-day interest in starch from sorghum grains, which were originally imported by the U. S. Department of Agriculture from Africa and China because of their resistance to drought conditions.

Used for Feed

As known today, sorghum grains include milo, kafir, durra, feterita, kaoliang and shallu. Until recently, they have been grown for poultry and animal feeds. They were considered to be substitutes for corn, but their hard grains were not fully digested by cattle or even by hogs. They were much more suitable for poultry feeding and were sold for that purpose at a higher price than corn.

Milo and kafir are of greatest interest. Kafir makes a better forage crop, while milo, with a less flinty berry, is the more prolific grain producer. Milo originally had such a crooked neck that harvesting by machinery was a headache.

The U. S. and state agricultural experimental stations, and enterprising farmers from Texas northward, bred the kinks out of the crooked-necked milo varieties and developed a straight-neck dwarf milo that is readily sown, cultivated and harvested with power machinery common to modern farms.

In the meantime, A. F. Swanson, agronomist, Agricultural Experiment Station, Hays, Kan., saw additional potentialities for the waxy or glutinous sorghum starch. Through selective breeding, he developed the Cody variety, which is highly productive of a waxy starch comparable to tapioca, and much in demand at a higher market price than is paid for corn starch. Further breeding developments have produced a double-dwarf waxy milo at Lubbock, Tex., and a carload of that seed has been shipped to Dodge City Industries for distribution to 1949 growers in the area.

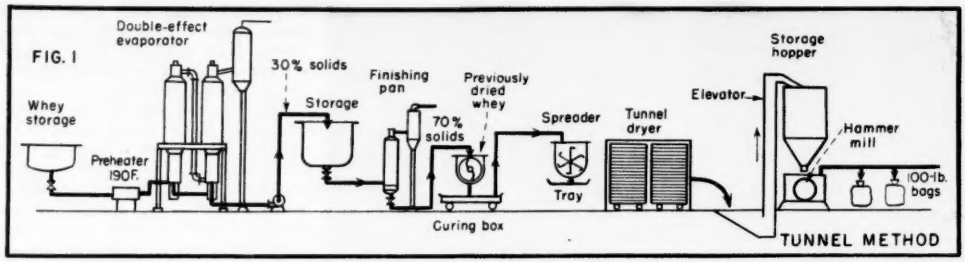
The plant is not making starch and other finished products. It merely dry mills the milo into its usable components. In greatest quantity are the grits, now ready to market. The bran is being shipped to Kansas State College, where research workers are doing further work on recovering the wax. The germ is processed for the recovery of oil content and the making of oil meal suitable for feed.

The wax has properties similar to those of the wax recovered from the leaves of the Brazilian carnauba palm tree and currently sells for about $1 per lb. A 100-lb. sack of milo bran yields about the same quantity of wax as is obtained in a year from one 40-ft. palm tree.

Cody starch, which has the glutinous properties of tapioca root starch, was used in dessert powders and similar products during the war, when tapioca imports were cut off. It is also used in making adhesives for plywood, in the weaving of tire fabrics, in refining bauxite ores to aluminum, in sizing of paper and textiles, in making of syrup sweeteners, and in other starch applications.

The plant is designed to process 2,000 bu. of milo or kafir per day. Employing about 12 men, it is run by Superintendent R. A. Warner, research chemist from Kansas State College, who designed and has directed operations of the processing machines. Perfecting of the equipment is still the day-to-day problem, and for that reason the plant continues at the pilot-plant status while opening the door to possibilities of a large variety of end-products.

* As this article was going to press, word came of the death of Mr. Isely at his home in Dodge City, May 14. His passing deprives FI, and other papers, of a valued contributor.



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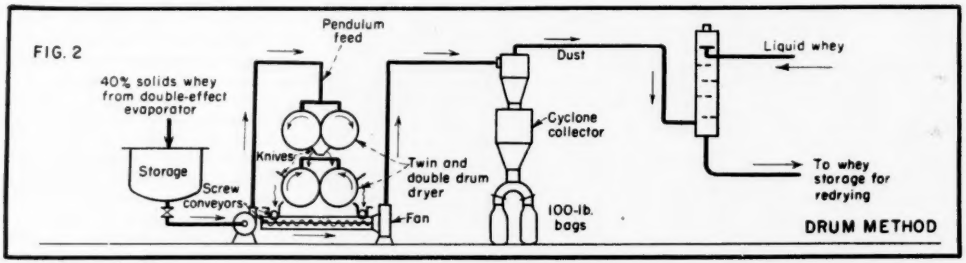

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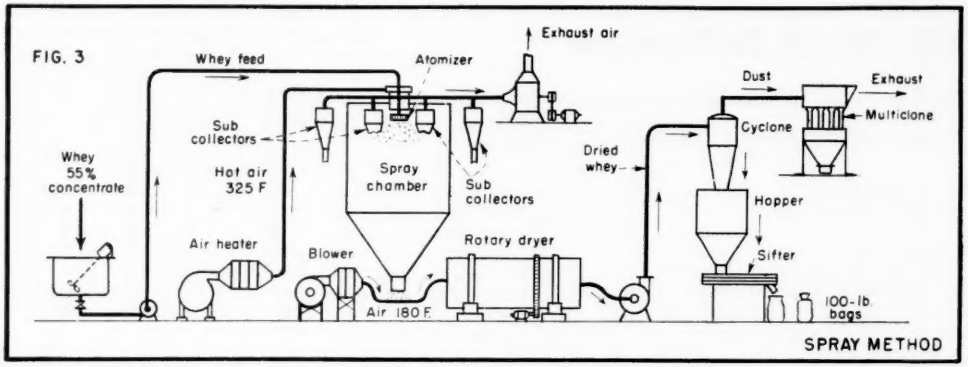


. . . or spray drying—

Wheys Once Discarded Now Provide Useful Products

Immediately suitable for animal feeds, they can be used to enrich soups, cheeses and other dairy products, candy, bakery products and baby foods

W. E. STRINGER
Chemical Engineer, Oneonta, N. Y.

Whey from cheese and casein plants, has been disposed of in many cases by piping to sewers, streams or rivers. As these practices increased, stream pollution resulted, and fish life was affected. Many states have now passed laws which prohibit such dumping.

But whey is nutritionally valuable. It is well balanced in carbohydrates, proteins and milk minerals, and contains riboflavin to the extent of approximately 1.5 micrograms per milliliter. Accordingly, whey may be used as an animal feed or feed supplement, or as the starting point in the manufacture of U.S.P. lactose and many other commercial products. In preparation for these uses, whey is dried.

A typical analysis of whey percentages follows: Lactose 5.0, ash 0.7, protein 0.8, and water 93.5.

Several manufacturing procedures are in use for converting cheese and casein whey into powder. One method

involves evaporation to a solids content of approximately 70 percent. To effect this, the raw whey is concentrated solely in a coil-type jacketed evaporator, or finishing pan, and discharged as a batch.

One disadvantage of this method is the high steam cost of single- as compared with multiple-effect evaporation. Depending upon the volume of whey handled, the economics must determine whether the higher steam costs of single-stage are not offset by higher overhead costs of multiple-stage evaporators.

A combination of continuous single- or multiple-effect tubular evaporation to 30 to 50 percent solids discharge, followed by final concentration batchwise in a single stage or coil-type jacketed vacuum pan to 70 percent solids, may be used advantageously. In this combination, large quantities of water may be continually removed in multiple-effect evaporators, usually the long-tube type with rapid circulation, and with high heat transfer rates maintained by not concentrating to a high solids content. A high solids content increases the viscosity, thus slowing down circulation and aggravating the "burn-on" effect on the tubes of the evaporator.

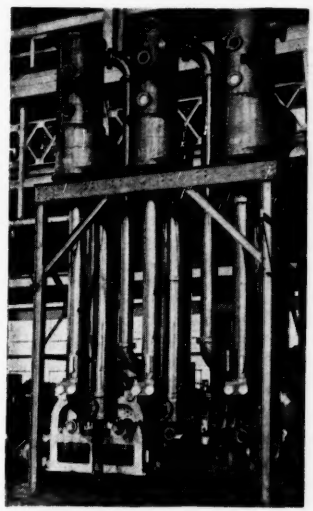
Approximately 40 percent solids is the upper limit which may be satisfactorily discharged continuously for long periods in one pass through multiple-effect tubular evaporators. A higher solids discharge is usually obtained by reconcentration under vacuum in single or multiple-effect evaporators. Thus, by a judicious determination of solids content in the discharge, high evaporating efficiencies may be maintained continuously.

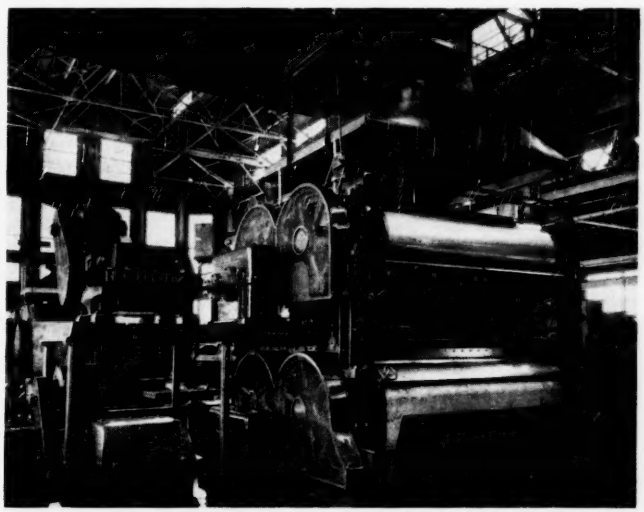
Pumps Must Be Carefully Selected

Choice of the correct type of pump is important for the continuous discharge from multiple effect evaporators. Inasmuch as the system is under vacuum, leaks must be guarded against and packings watched carefully. For the removal of lighter concentrated liquids (up to 30 percent solids) water-sealed centrifugal pumps may be used. The top of the pump casing is vented back to the evaporators vapor space.

Rotary, positive-displacement pumps are not very satisfactory, due to their

Highly Efficient Equipment Does the Job



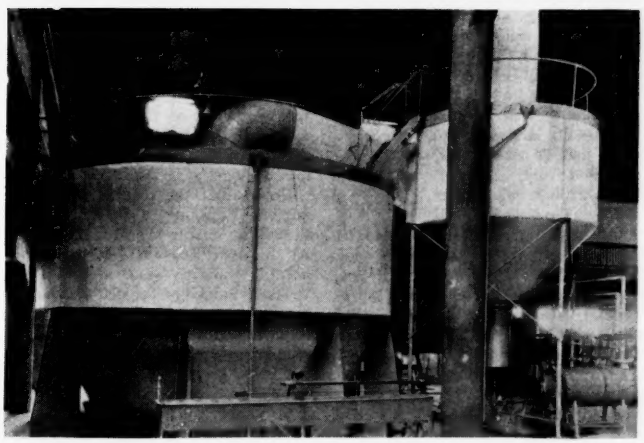


Photos above by Buffalo Die., Blow-Knee Co.

ABOVE: Triple-Effect Evaporators concentrate large volumes of whey preparatory to drying.

ABOVE RIGHT: Two-Stage Dryers receive concentrated whey on top rolls, complete drying on lower ones.

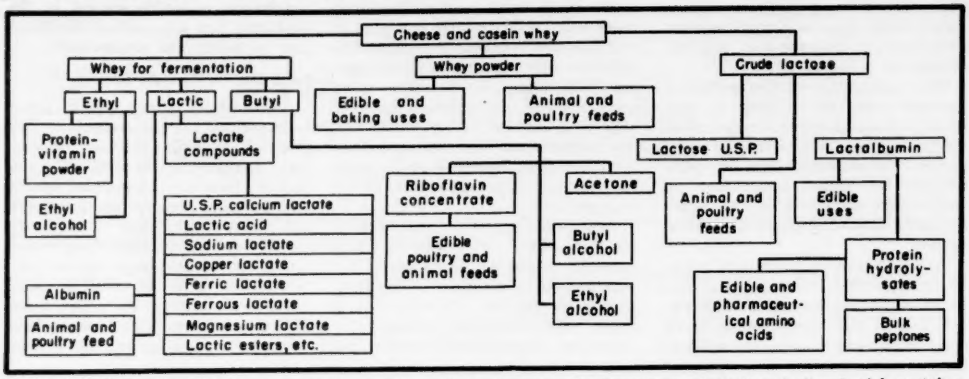
RIGHT: Spray Dryers have large capacities when combined with special rotary dryers.



ADVANCED FOOD PLANT ENGINEERING

30th of a Series

Whey is the Source of Many Valuable Commercial Products



IN ADDITION to animal feeds, whey can be used to produce pharmaceutical products, alcohols and vitamin rich proteins.

short life and also the galling effect of the whey on the rotors, even when stainless steel is used. Whey concentrate is corrosive as well as non-lubricating. This results in loss of the close clearance between rotors and casing, necessary for the satisfactory operation of this type of pump. For heavy, viscous liquids, such as 50 percent solids whey, single-acting steam-driven reciprocating pumps, with or without water-seal, have been used satisfactorily.

Batch Production of Powder

Whey powder may be produced batch-wise from the discharge of the concentrate from a jacketed coil-type vacuum pan. When casein whey, rather than cheese whey, is used as the raw material, the acid is neutralized by addition of a lime slurry just prior to making the strike. As the 70 percent solids concentrate is discharged, whey powder from a previous run is mixed with it to form a pasty material (see Fig. 1).

The mixing operation is accomplished in a trough provided with a screw conveyor. Both the dry material and the concentrate are introduced in the same end of the trough, and are mixed as they are conveyed forward. This results in a soggy, pasty agglomerate that is usually allowed to cure overnight until proper milk-sugar crystallization takes place.

At this point, the material is in a sufficiently hardened condition to be spread on drying trays. This is done by means of a spreading device consisting of an iron trough having a perforated bottom and revolving breaker arms which force the material through the perforations onto the drying trays. The trays are immediately racked on trucks and placed in drying tunnels.

Such dryers are usually provided with counter-current circulation of air, so that the exit air is nearly saturated. Drying generally requires from 3 to 4 hr. at a temperature of 160 to 180 F. Either forced or induced circulation of air may be used satisfactorily, but in either case it is important, for heat economy, that the tunnel construction be such that leakage of hot air out of the dryer or infiltration of cold air be eliminated. With high drying temperatures, tunnels constructed of wood are liable to warp. More satisfactory construction is sheet steel with proper insulation.

After drying, the material is dumped off the trays into a hopper leading to a hammer mill, where it is pulverized. The powdered material is packed in 100-lb. multi-wall paper bags containing an asphalt impregnated liner.

Expensive Operation

This method of processing is costly. And it is not conducive to good housekeeping. Considerable man-handling of the material is required, particularly after the evaporation step. It will be observed that high labor costs are involved in spreading of the cured material prior to drying. This involves labor not only to handle the material itself in feeding it to the spreader, but also for feeding drying trays to spreader as well as racking the spread trays on trucks, and then introducing the material to the dryer.

Reversal of the process after drying and emptying of the trays prior to milling involves still more labor. At the same time there is the housekeeping difficulty—due to the sticky or pasty nature of the material before drying, and the resultant splattering of the material on the floor during spreading, racking, and conveying of trucks to the dryer.

To offset these conditions, studies have been conducted leading to advances in the technics for both atmospheric drum drying and spray drying. And in both of these methods it is necessary to evaporate the raw whey to the optimum solids concentration. This is usually done by preheating the material to a temperature above the coagulation temperature of the protein (160 F.) and feeding it to multiple-effect evaporators. Such evaporators may be double-, triple-, or even up to quintuple effect. For drum drying, the solids content is usually of the order of 40 percent, while for spray drying 50 to 55 percent is necessary to assure maximum capacity.

Drum Dried Powder

In the drum drying operation, a two-stage dryer is used, consisting of four steam-heated iron cylinders mounted on the same frame and motor driven. Two of the rolls are set close together and parallel; and the other two, similarly arranged, are set directly over them.

The top drums revolve away from each other, and the bottom ones rotate toward one another (see Fig. 2). Variable speed drives are provided for each set of rolls, thus permitting control of the operations as conditions require. Feed to the drums is by means of an oscillating pipe that swings back and forth the length of the rolls. This distributes the material uniformly to the V-shaped trough that is formed between the rolls.

By means of doctor knives, the partially dried product is removed from the top rolls and dropped to the second set of rolls. The powder is removed from the latter rolls by another set of doctor knives. Thus in a sense, a two-stage drying operation is performed continuously.

Condition of the knives must be watched carefully to insure that they are kept sharp and close fitting. Otherwise, an insulating coating gradually

builds up, greatly decreasing the drying capacity. At the beginning of each day's operation, the knives should be carefully honed and sounded to assure close fit to the drum surface.

A hood and stack are mounted on top of the framework to remove vapors driven off during the drying run, and troughs are provided from which condensate may be piped.

Steam pressures of about 60 psi. are used on the upper drums and about 35 psi. on lower ones. Pipes for introducing steam, and for removal of condensate, are connected to the drive end of each drum's trunnions. Continuous removal of condensate is provided by means of a syphon which extends inside and nearly to the bottom of each drum. Small petcocks provide means of removing non-condensible gases. Steam consumption averages about 1.5 lb. per lb. of water evaporated.

Conveying and Packaging

The dried flaky, material removed by the knives is dropped onto a solid flight screw conveyor. From this conveyor the material is usually bucket-elevated to a hopper for direct bagging. Or it may be blown into a cyclone collector, preferably leading to a hopper from which it is bagged. The exhaust from the cyclone is discharged to a scrubber. This consists of a vertical cylinder (see Fig. 2) with staggered baffles. A fine mist of liquid whey or water may be introduced at the top, while the discharge from the cyclone enters at the bottom and moves counter-current to the spray, thus effecting scrubbing-washing of the dust with subsequent powder recovery.

Drum drying is an efficient, labor-saving process. Under conditions already described, and using drums 42 in. in dia. by 90 in. long, a capacity of 600 lb. per hr. of finished product is obtained. This is equivalent to processing about 10,000 lb. of liquid whey per hour. A limiting factor is the production capacity for this process, as compared to the spray drying capacity. In other words, 600 lb. per hr. of dried material is considered good production for one piece of roll drying equipment, and greater production capacities would have to be provided by proportionate increases in the number of drying rolls.

On the other hand, the spray drying method is more adaptable to larger production capacities—varying from 1,000 to 5,000 lb. dried material per hour.

In the spray drying methods, concentration of whey under multiple-effect evaporating conditions to about 50 to 55 percent solids is first performed. Usually, the concentrate is stored overnight under slow agitation to permit crystallization of lactose and aid in subsequent drying.

Sizes of drying chambers vary from about 15 to 30 ft. dia. They are usually cylindrical at the top with tapering to a cone shaped bottom. The concentrate is pumped to an atomizer (see Fig. 3) located in the top center of the chamber, and by means of a whirling disk with slotted openings in the side, it is discharged horizontally in a fine spray.

Thorough atomization is assured by revolving the disk at a speed of about 12,000 rpm.

At the same time, heated air (300 to 325 F.), introduced into a plenum chamber located above the atomizer, flows uniformly down around this spray wheel. Thus the sprayed material and heated air are in intimate contact and in parallel motion. Rapid drying proceeds as the particles swirl and fall to the bottom of the cone.

Material adhering to the sides of the chamber is dislodged by intermittent use of a Syntron vibrator installed on the outside wall.

Cyclone Collectors Used

Exhaust gases from the spray chamber are removed through small cyclone collectors. Usually about six in number, they are distributed evenly around the upper half of the spray chamber and connected to exhaust fans. These subcollectors are split into two units by means of duct work, and each unit is exhausted by one fan provided with proper damper control. It is thus seen that, in addition to exhausting the gases, the subcollectors also gather small portions of damp material which might be carried off.

Due to the nature of the product, complete drying is not attained in the spray chamber, and the material discharged from the bottom of the cone usually contains 85 to 87 percent solids. The material is led to a duct, which picks it up by a current of air heated to about 180 F., and carries it through a rotary dryer in order to complete the drying. The finished product contains about 3 percent moisture.

The powder and heated air pass in parallel flow through the rotary dryer. This makes for poor heat economy, but it is necessary due to the sticky nature of the product, and the fact that the milk-sugar, or lactose, content of the whey powder must be maintained in the hydrated form.

A fan on the discharge end of the dryer picks up the finished product and feeds it to a cyclone collector exhausting to a Multiclone. Material from the cyclone drops to a storage hopper, then goes to a vibrating Rotex screen, from which it is packaged in 100 lb. multi-wall paper bags.

The above method provides a means of handling large quantities of materials on a continuous basis. Elimination of milling is an added advantage of this method. And low overall operating costs offset deficiencies in steam economy. Spray drying units handling up to 5,000 lb. per. hr. of dried material, or the equivalent of about 1,500,000 lb. of whey per day, are not uncommon. For large scale operations of this type, whey is usually tank-trucked in from outlying feeder plants, both in the form of raw whey and whey concentrate produced at plants equipped only for evaporating.

Source of Other Products

As stated, whey contains milk sugar or lactose, protein in the form of lactalbumin and lactoglobulin, milk minerals, and vitamins. Thus it serves as a raw material for further processing (as indicated on an accompanying chart).

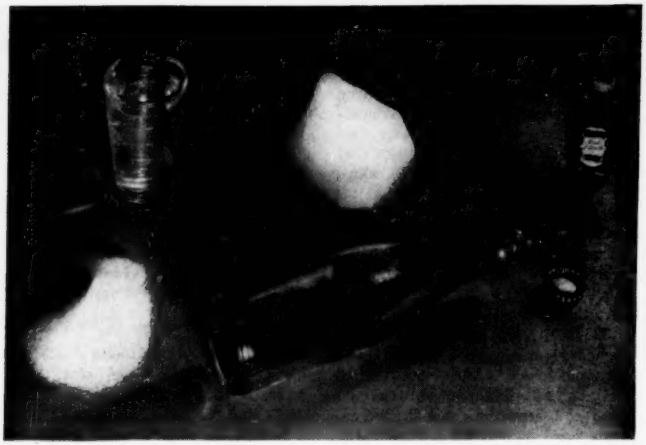
Whey may be processed to recover the milk-sugar content in the form of U.S.P. lactose. In this case, an animal feed well balanced as regards carbohydrate, protein, milk minerals and vitamins is also recovered as a by-product.

Or it may be subjected to preliminary recovery of the lactalbumin, which serves as an excellent raw material for protein hydrolysis in the production of amino acids, for use as a bulk peptone in the production of such anti-biotics as streptomycin and penicillin, as well as for edible and pharmaceutical uses. This preliminary processing is followed by the normal U.S.P. lactose manufacturing process.

Fermentation of whey offers still another means of processing, and patents have been issued covering this phase. Lactic, butyric and ethyl fermentations are practiced on a commercial scale. In the lactic fermentation, whey is fermented by means of *L. Bulgaricus* with a mycoderm, and calcium lactate U.S.P. is the primary end product, with calcium albuminate being produced as a byproduct for subsequent use in producing animal feed.

By means of butyric fermentation, whey is fermented with *Cl. acetobutylicum*, producing an enriched concentrate of riboflavin for use in supplementing animal and poultry feeds or for human consumption. Here, butyl alcohol, ethyl alcohol and acetone are produced as byproducts.

In the ethyl alcohol fermentation, a lactose-fermenting yeast, *Saccharomyces fragilis*, converts the milk sugar into volatile ethyl alcohol and carbon dioxide, both of which may be recovered in the concentrating and drying operations. At the same time a protein product, enriched with vitamins B_1 and B_2 can be recovered.



THESE six possible offenders—water, carbon dioxide, flavoring concentrate, sugar, bottle and crown—should be investigated when carbonated beverages spoil. Generally, it's not difficult to detect which one is responsible.

How to Hunt Down Beverage Spoilers

You can quickly put your finger on ingredients that are responsible by using this observation-and-logic method.

MOOSON KWAUK
The Coca-Cola Export Corp.
China Division, Colombo, Ceylon

Spoilage of bottled beverages may originate in a number of places—the culprits being impurities in one or more of the ingredients used, bottles or crowns. And tracing the trouble has usually demanded a complicated trial-and-error checkup involving numerous painstaking chemical and bacteriological operations.

To meet the need of a plant where very little chemical and bacteriological equipment is available, a method has now been developed from which conclusions quickly can be drawn by observation and logical reasoning. And only a few special samples are required.

Spoilage Defined

The term spoilage, as it is used in the present discussion, comprises any of the following phenomena:

1. Oil ring.
2. Precipitate ring.
3. Scale.
4. Precipitate.
5. Floc.
6. Off-taste.

There are only six categories of possible causes of spoilage: (1) Water, (2) carbon dioxide, (3) sugar, (4) concentrate or flavoring essence, (5) bottles, and (6) crowns. A study of them, however, will reveal the difficulties that can be experienced in locating the sources of the spoilage (see Table I).

Method of Determining Cause

Of the six sources of trouble, only four ingredients—water, CO_2, sugar, and concentrate will be examined as a first step. Mixtures can be prepared to consist of one, two, three or four of the above ingredients in the same proportion as in the bottled beverage. All mixtures must, of course, contain water.

Here are all of the possible mixtures that can be prepared with the above ingredients:

Number of Ingredients	Number of Mixtures
1	1
2	3
3	3
4	1
Total	8

If the remaining two sources—bottle and crown—are included, the total number of mixtures will be 32. It is evident that it is inconvenient to handle so many mixtures at a time. Therefore, bottles and crowns will be dealt with later.

The thus-prepared mixtures, or the samples as they will be called, are allowed to stand for as much time as is required to produce spoilage. These samples are numbered and described in Table II, in which "x" indicates the presence of a particular ingredient, and "—" means the absence of it.

Two Classes of Results

Results of such a tabulation can be classified into two categories—single-cause and double-cause.

A single-cause result shows that only one ingredient causes the spoilage. If any one of the four ingredients causes spoilage, then definite samples —and only these definite samples—will show spoilage (see Table III).

A double-cause result indicates that, in the absence of a single cause, spoilage. If any one of the four ingredients are together. For instance, protein, contained as an impurity in sugar, may be precipitated by the concentrate, while either the sugar or the concentrate, when present alone, will not cause precipitation. Table IV gives the relation between the particular samples spoiled and the two ingredients involved.

Examination of Tables III and IV indicates that there is no difference between the following corresponding single- and double-cause results:

2 and 1-2
3 and 1-3
4 and 1-4.

In any of the above three cases, the ingredient other than water—ingredient 1—will be considered as the *possible* cause. It will be noted further that for the above three cases, there is no guarantee that the bottle or crown may be the active cause of spoilage.

Bottle or Crown Suspected

Therefore, a second step should be taken whenever the results of Table III and IV indicate the following ingredients as possible causes:

1, 2, 3, 4, 1-2, 1-3, 1-4

The second step consist of providing three additional samples* as shown in Table V, in which "n" designates any of the ingredients suspected in view of the results of Tables III and IV. And Table VI serves for interpreting the results of samples prepared as in Table V.

It is obvious that in the two-step method described above, only eleven samples are required, whereas, as previously indicated, 32 samples would be required if water, bottle, and crown were taken into consideration in one step.

Up to this point, the scope of tracing has been narrowed to any one of the

* Sample No. 1n56 is same as in Tables III and IV.

six categories listed in Table I. From this point on, individual cases have to be handled with the same common-sense reasoning.

Offending Ingredients Located

Example I. Of the eight preliminary samples, the following were found to have flocculation:

14, 124, 134, 1234

Referring to Tables III and IV, the result indicates that water and/or concentrate may be the cause of spoilage. But, as noted earlier, concentrate will be considered as the *possible* cause. Therefore the following four samples were prepared:

1456, d456, 145′6, 1456′

Of this secondary group the following were found to give spoilage:

1456, 145′6, 1456′

With reference to Table VI, the above result indicates that water is the cause of spoilage.

An examination of the water treatment system gave these results:

Raw water: Slightly turbid
P = 0 ppm. as $CaCO_3$
M = 5 ppm. as $CaCO_3$
Cl = 0 ppm.
Treated water: Clear
P = 0 ppm. as $CaCO_3$
M = 12 ppm. as $CaCO_3$
Cl = 7 ppm.
Chemicals used: Alum
Soda ash
HTH
Floc formation: Satisfactory

Since the treated water is clear, suspended matter is evidently absent. Chlorination to 7 ppm. of chlorine seems to indicate the high improbability of microorganism as the cause. As a last possibility, residual aluminum ion may be suspected. Since treated water has zero P alkalinity, it is possible that the precipitation of aluminum ions is incomplete.

Therefore, it is advisable to adjust the base charges of the treating plant so as to give better precipitation of aluminum ions—that is, add more soda ash.

Example II. Of the preliminary group of eight samples, the following were found to give oil rings:

12, 123, 124, 1234

Referring to Tables III and IV, it is evident that the cause of spoilage is water and/or carbon dioxide. Again, carbon dioxide will be considered the *possible* cause.

Of the secondary group of four samples, the following were found spoiled:

1256, d256, 125′6 1256′

Therefore, carbon dioxide is obviously the cause of spoilage.

Examination of the system showed that residual oil was found in the carbon dioxide cylinders after they were emptied. A report to the manufacturer regarding the situation is indicated, or else carbon dioxide filters should be installed.

A Few Sample Mixtures Help Locate Offenders

TABLE I—SOURCES of Spoilage With Notes on Causes and Detection

Source	Cause	Method of Detection
Water:		
Suspended matter	Improper coagulation or filtration	Observation against strong light
Residual aluminum ion	Improper treatment	Precipitation on prolonged standing
Microorganisms	Improper coagulation or filtration, or insufficient chlorination	Agar culture
Carbon Dioxide:		
Foreign gases, H_2S, SO_2, etc.	Inferior fuel or improper scrubbing	Smell or chemical analysis
Oil	Compressor	Residue in CO_2 cylinder
Organic impurities	Fermentation byproducts	Smell
Sugar		
Insoluble materials	Burlap bag, etc.	Examination of simple syrup against strong light
Soluble protein	Improper refining	Chemical detection of protein
Microorganisms	Improper refining, packaging, transportation or storage	Agar culture
Concentrate:		
(or Flavoring Essence)	Refer to manufacturer	
Bottles:		
Residual washing compound	Incomplete final rinse	Phenolphthalein indicator
Scale	Hard water	Observation of dried bottle against strong light, or chemical analysis of water
Dirt	Improper washing	Observation of dried bottle against strong light, excessive foaming on inside wall of bottle while filling
Microorganisms	Dirty water for final rinse	Agar culture in washed bottle
Crowns:		
Crown dust	Improper cork or lithography	Observation
Rust	Inferior tin, or storage in humid air	Observation
Microorganisms	Inferior glue, improper storage	Mold formation on cork, or agar culture

TABLE II—EIGHT Different Mixtures are Possible Using Four Ingredients

Sample Number	Ingredient Number 1 Water	2 CO_2	3 Sugar	4 Concentrate
1	x	—	—	—
12	x	x	—	—
13	x	—	x	—
14	x	—	—	x
123	x	x	x	—
124	x	x	—	x
134	x	—	x	x
1234	x	x	x	x

x Indicates presence of ingredient. — Indicates absence of ingredient.

TABLE III—CHECK ON Spoiled-Sample Numbers Indicates Offender

Ingredient Causing Spoilage	Number of Samples Spoiled	Samples Spoiled
1. Water	8	1, 12, 13, 14, 123, 124, 134, 1234
2. CO_2	4	12, 123, 124, 1234
3. Sugar	4	13, 123, 134, 1234
4. Concentrate	4	14, 124, 134, 1234

TABLE IV—TWO INGREDIENTS are Involved in Double-Cause Spoilage

Ingredients	Number of Samples Spoiled	Samples Spoiled
1–2 Water—CO_2	4	12, 123, 124, 1234
1–3 Water—Sugar	4	13, 123, 134, 1234
1–4 Water—Concentrate	4	14, 124, 134, 1234
2–3 CO_2—Sugar	2	123, 1234
2–4 CO_2—Concentrate	2	124, 1234
3–4 Sugar—Concentrate	2	134, 1234

TABLE V—BOTTLE OR CROWN May Also Cause Spoilage

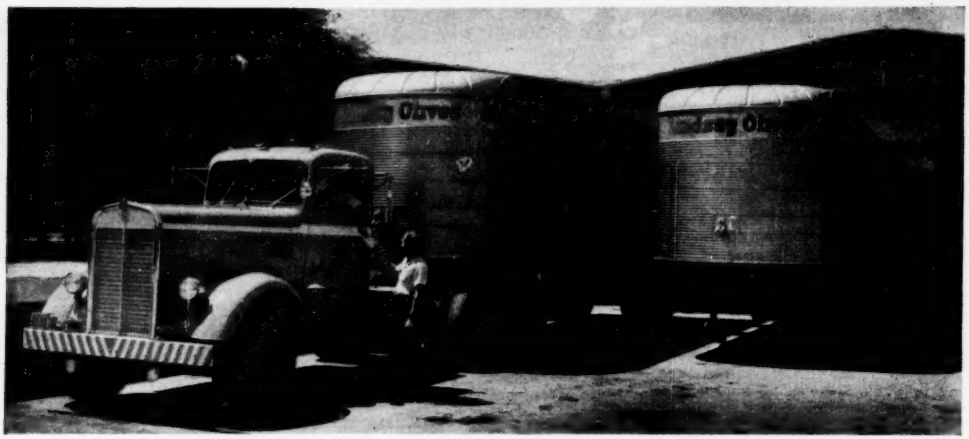
Sample Number	1 Bottling Water	d Distilled Water	n Ingredient	5 Bottle from Soaker	5′ Bottle spec. Washed*	6 Regular Crown	6′ Rubber Stopper
1n56	x	—	x	x	—	x	—
dn56	—	x	x	x	—	x	—
1n5′6	x	—	x	—	x	x	—
1n56′	x	—	x	x	—	—	x

*With concentrated acid and rinsed with distilled water.
x Indicates presence of ingredient. —Indicates absence of ingredient.

TABLE VI—THIRTEEN MIXTURES Are Required When Bottle and Crown Are Checked

Cause of Spoilage	Number of Samples Spoiled	Samples Spoiled
n Ingredient	4	1n56, dn56, 1n5′6, 1n56′
1 Water	3	1n56, 1n5′6, 1n56′
5 Bottle	3	1n56, dn56, 1n56′
6 Crown	3	1n56, dn56, 1n5′6

It's "in with one and right out with the other"



OUTBOUND product-loaded trailer is ready to go after tractor's inbound load of supplies is spotted at the dock.

Get Your Shipping Costs Down With Return Loads

Supplies and materials brought to plant will balance outgoing shipments of products to keep truck haulage costs far below rail shipping rates

THE SMALL but well-engineered truck fleet of the Lindsay Ripe Olive Co., Lindsay, Calif., offers an outstanding example of how a food processing plant can speed up operations and save money, on both inbound and outbound shipments, by the judicious use of automotive equipment.

The company is the world's largest in its field, processing from 22 to 25 percent of all the ripe olives packed in the United States. The groves from which the company obtains its olives are all in Tulare County and within a 50-mile radius of the Lindsay plant. The plant is served by railroad and has its own rail siding. But good roads radiate in all directions, especially south to Los Angeles (150 miles) and northwest to the industrial San Francisco Bay area (240 miles).

Prior to May, 1948, two flat-bed straight trucks and one tractor-trailer composed the fleet. The company has not handled any outbound tonnage by rail to the San Francisco-Oakland or the Los Angeles areas for 15 years, because it has considered the rail service unsatisfactory and costly compared with truck deliveries. Since most of the company's sales are LCL to jobbers or chains, rather than to retail stores, the cost of distribution is much cheaper when the trucks can deliver direct to the purchaser.

But this initial cost reduction was only a beginning. The company soon discovered that even greater savings could be achieved by utilizing the trucks for return loads, thus spreading the overall trucking costs over more tonnage. Every outbound run to the San Francisco-Oakland area has a backload. And most of the runs to the Los Angeles area likewise have backloads. The use of its own automotive equipment is also necessary to enable the company to compete with other olive plants located closer to the California markets. Except in the case of salt used in the olive processing, all of the backloads consist of cannery supplies.

Salt Corrosion

Large quantities of salt are used in the olive processing operations. And because of its corrosive action on most metals, its haulage had presented unusual problems. Among the difficulties were the effect of corrosion on the haulage equipment and the need, accordingly, for both quick loading and unloading.

After investigating numerous types of trucking equipment suitable for handling backloads of damp salt into the plant, the company, in May, 1948, introduced a diesel tractor and two 35 ft. Fruehauf stainless steel panel trailers, each capable of carrying 20 tons of salt.

Since their adoption, the trailers have been hauling from two to five backloads of damp salt per week from the plant of the Leslie Salt Co., situated 200 miles from the Lindsay plant, at Newark, Calif. This is in the San Francisco Bay area, where the salt is precipitated from sea water by evaporation. The salt backhaul is made in eight hours as compared with from three to five days by rail. By using the same trailers for outbound loads of canned ripe olives, barreled green olives, and olive oil in glass bottles and steel drums to the San Francisco area, the overall inbound and outbound rail freight costs have been cut about 50 percent.

Part of this economy has been due to the one tractor and two trailer set up. With two drivers working the trailers on a shuttle system, a complete round trip is made each day.

While the first driver with the diesel tractor and one trailer is making deliveries in the San Francisco area and then picking up supplies or a load of damp salt from the Leslie plant in Newark, the second driver is sleeping in Lindsay, while the second trailer is being loaded with an outbound shipment at the Lindsay plant. When the first driver with the inbound load on the first trailer reaches the plant each night, he backs his trailer up to the plant platform for unloading the next day, then disconnects his tractor and

since loading and unloading are carefully timed

CONVEYORS serve to unload cartoned supplies and reload trailers with outbound olives processed at plant.

hooks it up to the second loaded outbound trailer. The second driver then takes over and starts on his San Francisco or Los Angeles outbound trip. Both drivers are based in Lindsay.

In this shuttle trailer operation, the inbound loaded trailer lays over at the Lindsay plant for a full eight-hour working day to be unloaded and reloaded, ready for the next trip. If the trailer is loaded with supplies in cases or cartons, these are unloaded speedily by portable sectional roller conveyors. For the quick reloading of cases of canned olives, the same conveyors are employed. The cases are fed onto the conveyors inside of the trailer body from a live, power-driven belt inside the plant warehouse. An electric eye counter is used to verify the load.

If the trailer to be unloaded is carrying a 20-ton load of damp salt, it is unloaded into a sump a few feet off the ground by means of a power operated scoop inside the body. The scoop is pulled to the rear of the trailer by means of a cable and capstan driven by a small electric motor.

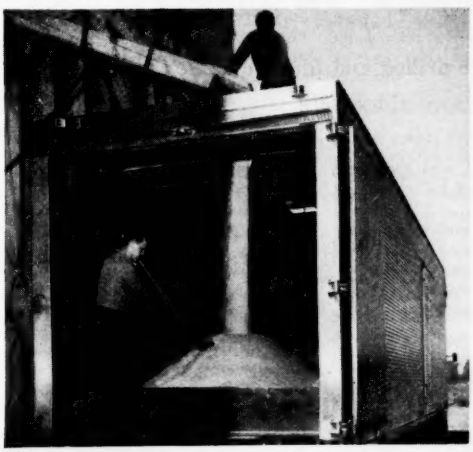
The trailer exterior sides, rounded front nose, and roof were made of stainless steel because salt does not affect this metal. It is also much stronger than either common steel or aluminum.

The trailer interior is lined with plywood to give a smooth loading surface. The plywood is treated with special waterproof material and sealed at all joints with stainless steel strips.

The trailer floor is made of Diamondette steel plating, welded into one unit and turned up at the front and sides to form a shallow pan.

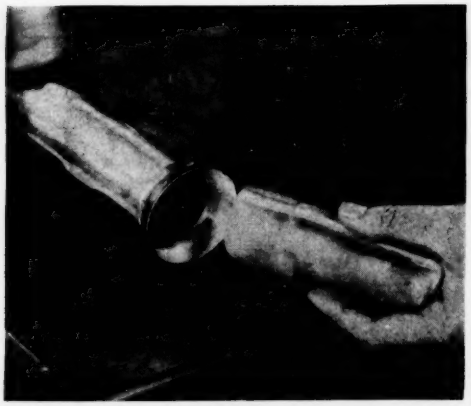
In operation, the steel floor is kept from rusting by washing and by the scouring action of the loading and unloading of both salt and other goods. But the lined walls are difficult to keep clean and dry. Experience proved to the company that some salt brine penetrates the plywood wall lining and will attack the body exterior walls from the inside if they are made of either common steel or aluminum.

Salt keeps the schedule—at a ton-a-minute clip

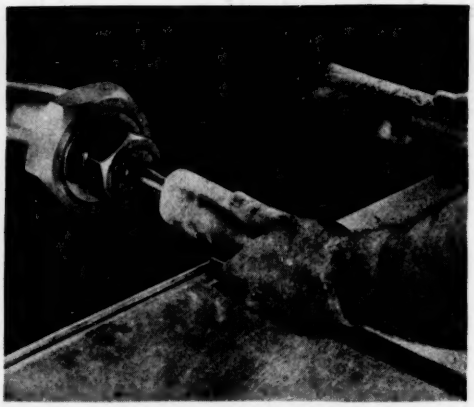


STAINLESS STEEL panel trailers take on 20 tons of salt in 20 min., causing no delay in return schedules.

SALT is unloaded into sump by a scoop pulled by cable and capstan. Small electric motor supplies power.

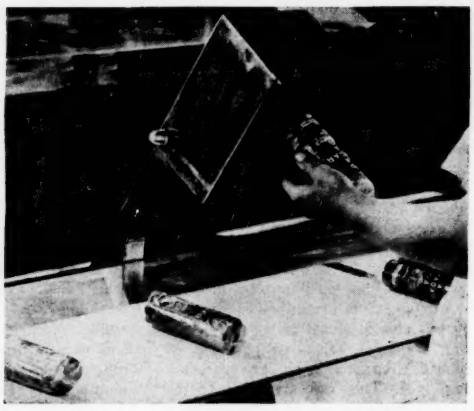


1. Buns are first "holed" by auger device . . .



2. Then extruder injects them with fillings . . .

5. In final packaging step, girls heat-seal . . .



6. . . . each wrap by holding against hot-plate

Assembly Line Makes "Mechanized" Sandwiches

Novel system produces molded buns which are drilled and filled to make snacks that vendors heat in ten seconds with special toasters

K. D. KAHN*
"Food Industries" Correspondent, Los Angeles
Photos by Mill's Studio

Radar Sandwiches—unusual, tubular, molded, filled snacks—are being produced in Los Angeles. The trade-name is a connotation signifying the speed of heating—only ten seconds being needed to toast the delicacies in the special machine employed.

The sandwiches themselves are manufactured on an assembly-line basis. Cavities are made in the buns, the filler is extruded into it, the sandwich is packaged and cased, then stored in a refrigerated room. The products are delivered in refrigerated trucks to the retail vendors, who heat them in the special toasters before serving to customers.

Manufacturer-distributors of Kistler's Radar Sandwiches are franchised by the parent company in Akron, Ohio. This firm also sells the bun molds and the sandwich toasters.

High-Type Bun Dough

The molds comprise two parts and have a locking mechanism. Each pan holds 24 cylindrical rolls of uniform size (1¾ in. dia. by 5½ in. long). The dough mix, high in protein and sugar content, is similar to that used for Parker House rolls—fine textured and uniformly light.

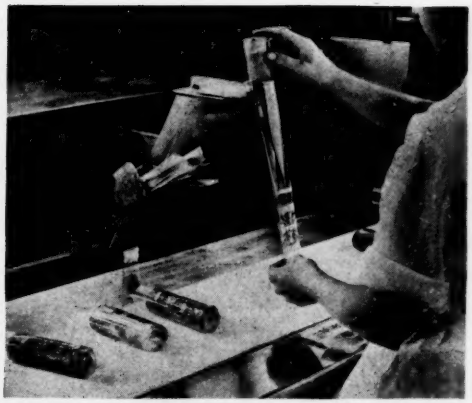
Filling materials used in making the sandwiches are blended by the distributor's cooks, who follow formulas originated by the parent company.

The Los Angeles plant, of which Richard L. Gray is president, has a capacity of 500 doz. of these sandwiches daily.

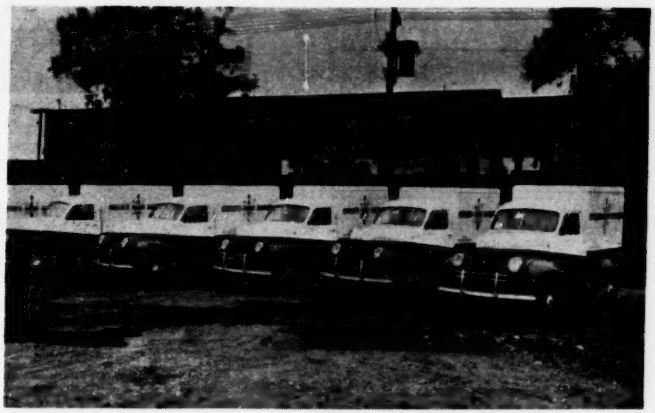
Two sandwich-assembly lines are operated. At the start of the process, a ¾ or ⅝ in. hole is bored in each bun, according to the kind of filler that is to be used. The boring ap-

* This is one of the last contributions of FOOD INDUSTRIES Correspondent Kahn. He was recently killed in an automobile accident in Texas.

3. . . . fresh-made in gas-fired copper kettles



4. And sandwiches then go into wrappers



7. Trucks take sandwiches to retailer, to be sold hot . . .

8. . . . from 10-sec. toaster

paratus, a wood-type auger, drills a longitudinal hole through the bun center to within a half-inch of the end. A spring guide and stop plate control the depth of the hole, hence the operator just pushes the bun into the boring tube as far as it will go.

Precooked fillers or those that are heat-blended are prepared in copper kettles that are gas-fired. These materials, when ready to be filled into buns, are then moved to the extrusion lines.

From the coring mechanism, the buns go by conveyor over a stainless-steel table to the extrusion filling station. Buns are filled with about $1\frac{3}{4}$ to 2 oz. of mix. Hydraulic pressure (about 800 psi.) is used for extruding the materials.

Wrapping Technic

After the bun is filled, the operator replaces it on the conveyor and it moves to the packaging station. Here, a worker first opens the prepared wrap and positions it on the packaging tube. Then the filled sandwich is dropped through the tube into the wrap. The wrapped, but unsealed, sandwich then moves on the conveyor to the sealing station (foreground of Photo 5).

Six Kinds of Sandwiches

The sealer first folds the ends of the wrap, then holds the fold against a hot stainless-steel plate which heat-seals the protective cellulose. The wrapped sandwiches are then placed in cartons. Six different kinds of sandwiches are produced at this plant —hamburger, chiliburger, chopped barbecued beef, cheese, minced ham, and weiner. The weiner sandwiches are cored the regular way, but are filled by hand.

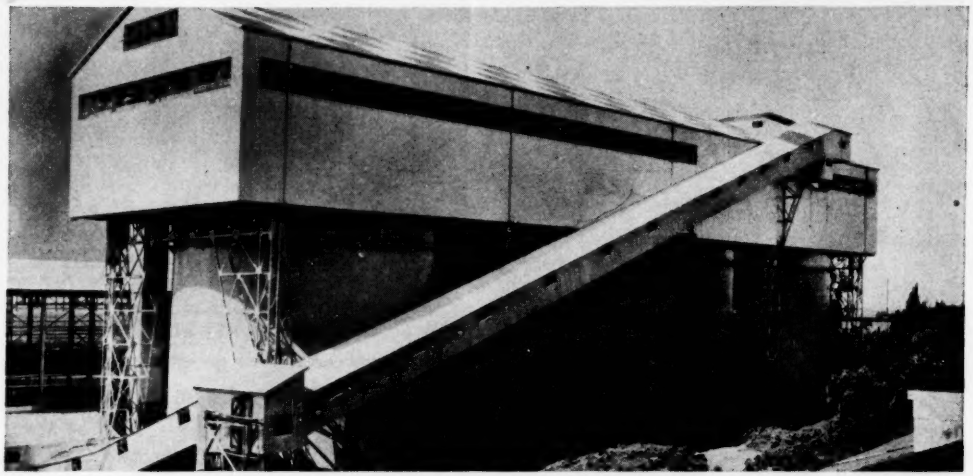
The boxed sandwiches are placed on mobile racks and moved into the chill room, where a temperature of 38 deg. F. is maintained. All finished sandwiches are kept in this chill room until they are to be delivered. Thus, quality is maintained and there is protection against bacterial contamination of the filling materials. General sanitation is a comparatively simple matter, since all equipment with the exception of the conveying belts, is of stainless steel. Periodic tests on the product have shown an absence of any harmful bacterial conditions.

Delivery is made in six insulated service trucks. The chilled product provides self-refrigeration during the short time required for delivery to vendors. One truck is considered adequate for a distributor in a community of 100,000 population.

Fast Heat for Fast Sales

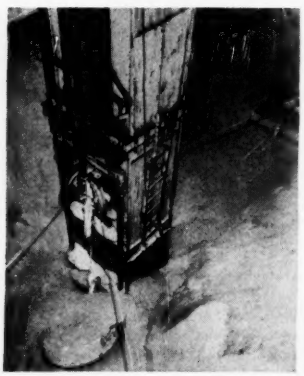
Toasters employed by the vendors feature high capacity heating elements arranged to apply the penetrating heat completely around the sandwich exterior. About 10 seconds are required to heat the sandwich thoroughly. Temperature developed by the toaster is in the 400–500 deg. F. range. This heats the sandwich center to about 190 deg. F.

LEAVING HAWAII: Stored raw sugar is

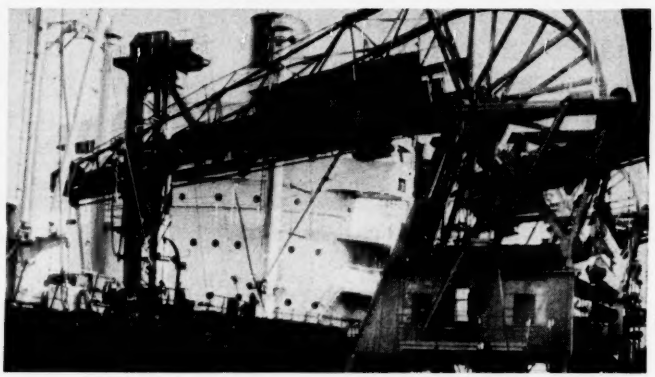


1 **RAW SUGAR** is now collected in bulk storage plants at the ports. On arrival by truck at these new facilities, the sugar is weighed and carried up inclined belt to headhouse, then dumped into silos. This plant is at Hilo.

AND ARRIVING IN CALIFORNIA: It is bucket-unloaded,



4 **SUGAR** is removed from boat's hold by bucket elevators.



5 **IT COMES UP** to belt conveyors mounted on gantries, which can be moved along dock to various hatches on ship. Sugar then goes to storage.

Hawaiian Sugar Industry Converts to Bulk Handling

Advantages over bag system are many—economical, no-container handling, reduced loading and unloading time, and more efficient use of space

E. B. SCHMALZ
Assistant Pacific Coast Editor, "Food Industries"

Fully 400,000 tons of raw sugar—nearly half of the total output of the Hawaiian Islands—is now being shipped to the refineries in bulk form, rather than in 100-lb. burlap bags.

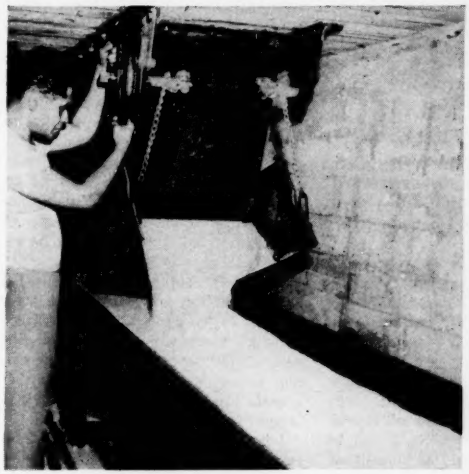
This striking change in the method of transporting the sugar has mainly come about since the end of the war. The pioneering, however, dates back to 1942. It was in this year that a plant at Kahului successfully initiated the bulk practice.

But first a little perspective: The four major Hawaiian Islands currently produce nearly 1,000,000 tons of raw cane sugar yearly.

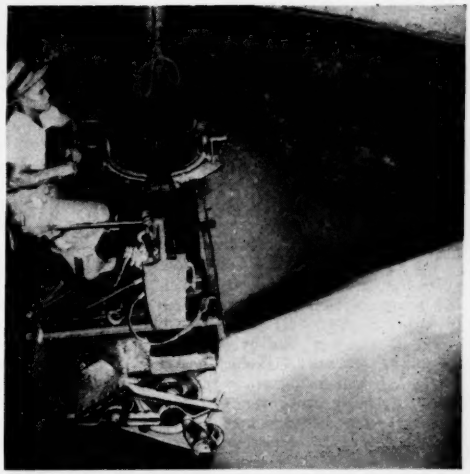
Most of this sugar is refined at Crockett, Calif., by the California and Hawaiian Sugar Refining Corp., cooperatively owned by the plantations.

Certainly, bulk shipment offered obvious advantages. It would eliminate the cost of burlap containers; reduce handling costs; make possible more efficient use of steamer cargo space, and reduce time required for loading and unloading steamers. Off-

bulk-conveyed to dock and "trimmed" into ship hold

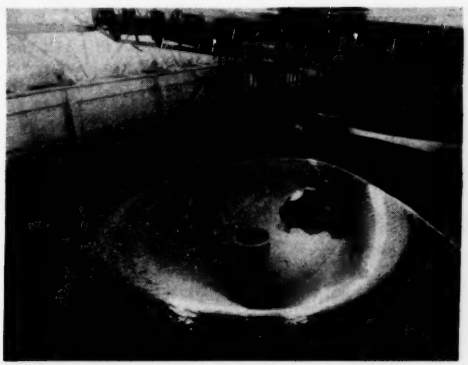


2 **SUGAR** is drawn from the huge bins and carried on continuous belt conveyors to boat at dock

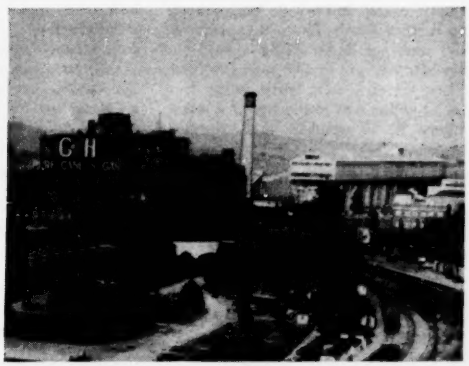


3 **HERE** in boat's hold, sugar streams from a Sinden trimmer, is thus evenly distributed.

conveyed to storage, then "belted" to refinery



6 **IN REMOVING** stock sugar from bin, a clam-shell bucket drops it through center pipe to a belt.



7 **BELT SYSTEM** then whisks it from storage house (right background) to the huge refinery (left).

setting these savings would be the costs of the bulk facilities.

It was decided that the advantages tipped the scales.

The initial bulk sugar storage plant, at Kahului, on the island of Maui, was completed in 1942. Since then, Maui's three plantations, producing about 15 percent of the total Hawaiian production, have shipped all their raw sugar to Crockett in bulk form.

This Kahului plant comprises square wooden bins with a storage capacity of 30,000 tons. Bulk sugar is delivered to the plant in rail cars and trucks. To load ships, sugar flows by gravity through openings in bin floors to belts which carry it to the steamer holds, where it is evenly filled by use of the Sinden trimmer. Feature of this machine is a belt running at 4,000 ft. per min. that throws sugar in a stream into all parts of the hold.

On the mainland dock, two steel gantries were erected to unload the bulk-sugar boats. These gantries were equipped with continuous-chain bucket elevators which can be lowered into the open steamer hold.

First Movements

At the time of this installation—1942—Crockett had no permanent storage facilities, so the raw bulk sugar was stored in a section of an existing warehouse.

These first movements of bulk sugar quickly demonstrated the feasibility of bulk shipments. But war with Japan delayed further expansion.

Bulk Capacities Increased

The second bulk sugar plant, at Hilo on the island of Hawaii, was scheduled to begin operations as this magazine went to press. Here, the installation consists of four steel silos, 76 ft. high and 80 ft. in diameter. Each silo has a rated storage capacity of 10,000 tons of raw sugar, giving a total of 40,000 tons storage capacity. Now over 400,000 tons can be shipped annually in bulk form.

Bulk sugar is moved from planta-

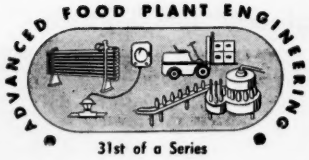
tion mills to the port storage plant in 20-ton trucks. On arrival, they drive first into an elevated scale house. Then after weighing, sugar is dumped into receiving hoppers below the floor.

The conveyor system transports sugar up a series of inclines to the top of the storage warehouse, where another series of conveyors delivers it to any one of the four silos.

During the filling process, a discharge tube is erected vertically in the center of each silo. This tube is formed of sectional steel pipes, 6 ft. in dia. and 6 ft. long. As the sugar builds up in the silo, tube sections are added one on top of the other, providing a central discharge core through the stored sugar.

The silos are emptied by means of an 8,000-lb.-capacity clamshell bucket carried by a traveling crane running on a superstructure over the four silos. The clamshell picks up the sugar and drops it down the discharge tubes. As the sugar level is lowered, tube sections are removed.

At Hilo, when a steamer is loaded, sugar is drawn from two tanks at a time. From the bottom of the discharge tube, sugar is carried onto two parallel, 36-in.-wide belt conveyors with a rated combined capacity of 700 tons per hour, giving an average net loading rate of 500 tons per hour. These parallel belts carry sugar up a series of inclines to the top of a tower, where it is weighed and sampled.



Another series of conveyors transports it from this tower to the dock.

The last section of these conveyors is set parallel to the face of the dock to deliver the sugar to two shiploading gantries.

The new Hilo bulk storage plant is owned by Matson Navigation Co., and the Hilo Transportation & Terminal Co. is the operator, under a lease.

Third Plant

Another bulk sugar plant is now being constructed at Nawiliwili (port of Ahukini) on the island of Kauai. When completed, next year, it will be possible to ship about 60 percent of Hawaiian raw sugar production in bulk form.

Few alterations were needed to adapt ten of Matson Navigation Co.'s fleet of C-3 cargo vessels to carry bulk raw sugar. Lower holds were wood-sheathed to keep sugar away from steamer hulls. Eyebolts were installed to anchor the blocks carrying the cables that operate the dragline scrapers used to pull sugar from back hold sections to the gantry elevator.

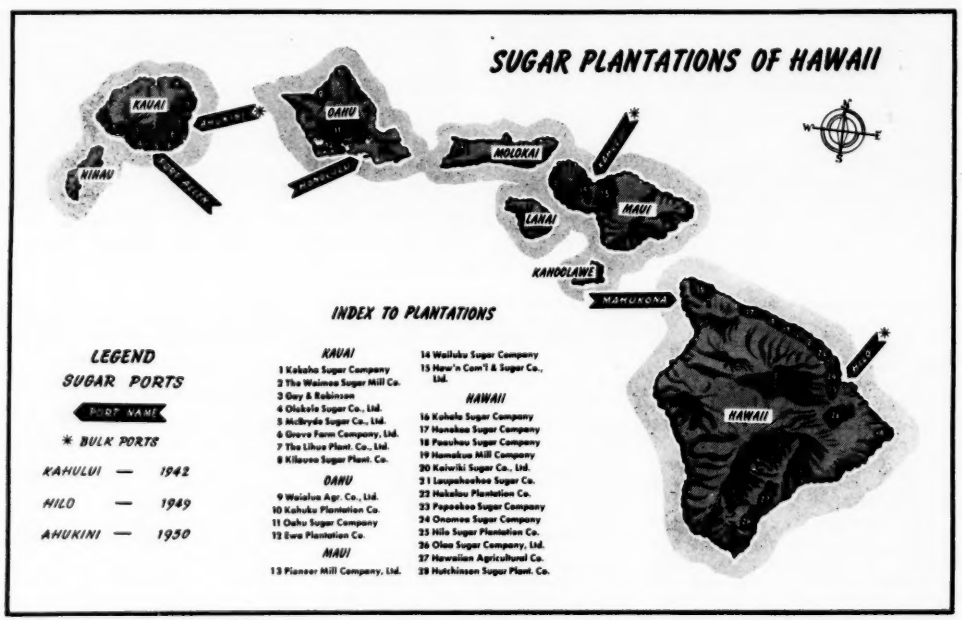
The new Crockett bulk storage plant consists of nine steel silos of the same type and size as those at Hilo, giving a total storage capacity of 90,000 tons of raws. Construction of this $2,500,000 plant began in April, 1947, and five of the silos have been in use since June, 1948. The remaining four tanks were about to be put in operation as this article was being printed.

Bulk-sugar ships arriving at Crockett are unloaded by two gantries on the refinery dock. These gantries are arranged to travel the full length of the steamer, so that sugar can be removed from any hatch.

Sugar from the hold is delivered to a receiving conveyor, which runs parallel to the gantries' line of travel, carrying the sugar off at an average rate of 250 tons per hr. The receiving conveyors deliver the sugar to a scale tower, where it is weighed in hopper-type scales and sampled.

Leaving the scale tower, sugar is carried, on a system of 42-in.-wide belts, to the top of the storage warehouse. Here, a series of conveyors delivers it to any one of the silos.

Sugar is removed from these silos in exactly the same manner as at Hilo, but at a somewhat slower rate. At the bottom of the central discharge tube, sugar is delivered to a belt conveyor. A series of these conveyors transports the sugar to the refinery, where it is again weighed before delivery to the melt station for refining.



BULK SUGAR storage plants are indicated at Kahului, Maui, and Hilo, Hawaii. Plant at Ahukini, Kauai opens in 1950.

FI Award (left) goes to citrus canner for juice process involving revolutionary evaporator (right).

AWARD FOR PROGRESS

To Florida Citrus Canners Cooperative for frozen concentrated citrus juice process

FOR OUTSTANDING technological achievement in food processing, Florida Citrus Canners Cooperative, Lake Wales, receives the 1949 FOOD INDUSTRIES Award. This award — which goes to a company rather than an individual — recognizes the significance of the process for making high-quality frozen concentrated citrus juice.

As a result of this development, the juice is preserved in the near-natural form, with high vitamin C content and excellent flavor. The health-giving product is made widely available to consumers at a reasonable price and in a form permitting economical distribution and convenient use.

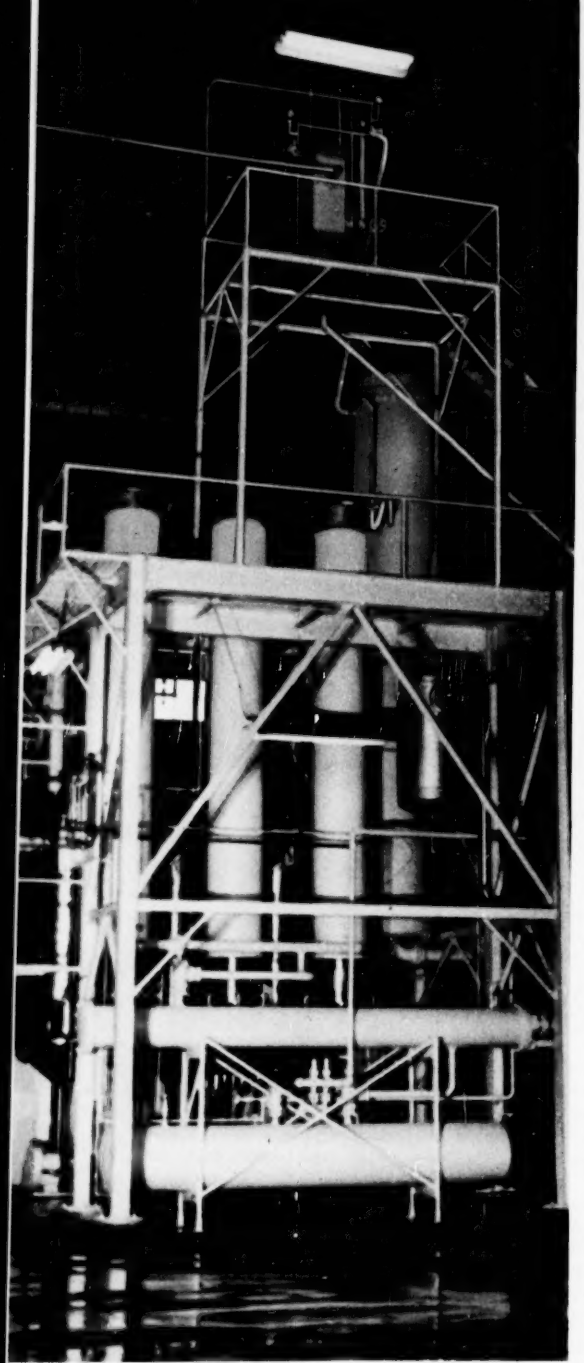
In addition to contributing to more pleasant living and better health, the process is helping the citrus industry and citrus growers. And what is more important to the food processing industry as a whole, it makes available important new know-how which can be applied to the processing of other liquid food products.

The achievement of 20 years of research and development, the process represents food technology and engineering at its best. By creative thinking and ingenious application of new ideas — plus a great deal of perseverance — the technologists and engineers who made the process possible solved a tough problem of long-standing.

This process received a high score for each of the factors used in evaluating it by the members of the Award Committee. It is of broad significance to the food industry — is highly successful and of economic importance — involves originality in ideas and application of basic principles — is relatively simple and free from probable operating delays and mechanical difficulties — creates a new market for a surplus raw material — and involves high standards with respect to sanitation, purity, appearance and quality of product.

The committee which selected this process as the winner of the FI Award was appointed by the Institute of Food Technologists. It was composed of 26 food technologists connected with universities and colleges. The chairman was Dr. Samuel C. Prescott, Dean Emeritus of Massachusetts Institute of Technology and first president of IFT.

Information on the process, and its development and success, is presented in the following pages and in a foldout picture-flowsheet, on pages 92-95.



HEART of the process is this three-stage, high-vacuum, low-temperature evaporator. High efficiency is attained through heat-pump principle. Compressed ammonia gas condenses as it supplies heat to boil juice. Then ammonia evaporates and absorbs heat from water vapor given off by boiling juice, condensing the vapor. A pressure of 0.25 in. absolute of mercury is maintained in the water-vapor condenser by a two-stage gas ejector.

Frozen Concentrated Citrus Juice Process Contributes New Know-How

Few developments in food processing have had an impact so intense and so widespread

TO PICK UP the story of the development of the revolutionary process for producing frozen concentrated citrus juice, we go back to 1929. At that time, J. L. Heid, now director of research for Florida Citrus Canners Cooperative, was on the staff of the U. S. Fruit & Vegetable Chemistry Laboratory at Los Angeles. There he observed that flash heating in high-velocity tubular heaters permitted the canning of citrus juice with better flavor than could be obtained with kettle heaters.

In the years following, as flash pasteurization gradually came into commercial use, it became evident that extension of the shelf life of canned juices was the next problem for the canning technologist. While means for doing this were being developed, work was also under way to solve the problem of delivering a preserved citrus juice with a flavor which equaled that of juice freshly squeezed from selected fruit.

In tests at the Los Angeles Laboratory, juice was thoroughly deaerated, canned and quick-frozen by immersion in alcohol at −90 deg. F. This was held at 0 deg. for several years without perceptible deterioration in flavor. But container, shipping, and storage costs were high, and facilities for handling the juice at 0 deg. were not generally available.

Equipment for concentrating citrus juice had been improved meanwhile. Time in the evaporator had been shortened, multiple stages introduced, and operating temperatures and pressures lowered. Enough improvement had been made in the product to indicate that it might be possible to concentrate citrus juice without appreciable modification of taste. This could be done, it seemed, if operating temperatures, pressure, and time could be reduced still further.

However, temperature of the available condensing water imposed a limitation on the reduction of operating temperatures — unless uncondensed vapors were pumped or refrigerated condensers were employed.

To make a long story short, juice was concentrated at low pressures without modifying the taste. This was done with equipment and methods planned by L. G. MacDowell, director of research, Florida Citrus Commission, and J. L. Heid, then director of USDA Citrus Products Station, Winter Haven, Fla.

But there was one fault with the concentrated juice. The flavor was flat, because of loss of volatile constituents. Addition of orange oil, as is done with conventional concentrate, improved the flavor. But the investigators improved upon this. They developed a process for concentrating the juice to 60 percent solids, then added sufficient unconcentrated juice to reduce the solids to 42 percent. The result was a concentrate which, when reconstituted after freezing, could not be distinguished by most tasters from freshly squeezed juice.

Engineer Makes Ingenious Suggestion

This was real progress. And Florida Citrus Canners Cooperative decided that the product had commercial possibilities. So they called upon Mojonnier Bros. Co., in 1944, to supply equipment to produce it.

The objective and the problems were discussed with

Mojonnier's engineer, J. A. Cross. Among the problems was 80-deg. cooling water. This meant that it would be necessary to compress all vapors through a booster before condensing, or condense the vapors in a refrigerated condenser ahead of the evactors.

Mr. Cross suggested using both sides of a refrigerant compressor system — the heat-pump principle. Water would be evaporated from the juice in one tubular heat exchanger, with heat obtained by condensing compressed ammonia. Then the water vapor would be condensed in a second tubular heat exchanger by evaporating the liquid ammonia through an expansion valve. This would give an approximately balanced system of high efficiency. In addition, the low temperature of the compressed ammonia (105 deg. F.) would eliminate the hazard of local overheating and permit adoption of the falling-film principle of operation for the evaporator.

The equipment was built and pilot tests conducted in the spring of 1945. These tests were entirely satisfactory, and a commercial plant was designed.

In February, 1948, Florida Citrus Canners Cooperative completed a new and revolutionary plant at Lake Wales, Fla. Incorporating the equipment and methods developed after the pilot tests, it was designed and built solely for preserving juice of carefully selected citrus fruits, without modification of flavor or food value. The heart of the successful process is quick, high-vacuum low-temperature (50 to 70 deg.) concentration of deaerated juice, followed by blending with unconcentrated juice, slush-freezing, canning and hard-freezing quickly to 0 deg. F.

Close control of quality is another vital factor in the process. Top-grade fruit is inspected, then passed through a brush and spray washer and a detergent tank. A second inspection follows, then another brush and spray washing — this time in water containing 5 ppm. — of free chlorine to give a practically sterile outer surface. After sorting for size by machines, the fruit goes to the extractors. Here again, quality is protected. A tube is inserted in each fruit to drain the juice as the fruit is squeezed, bitter principles being excluded. Fast and closely controlled processing follows, as described on the foldout picture-flowsheet, pages 92-95.

How Revolutionary Evaporator Works

Because of the revolutionary nature and far-reaching significance of the evaporator, let us consider its many advantages:

1. Multiple-effect economy in fuel or power used, at a single evaporation temperature.

2. Evaporation temperatures may be fixed at any desired point — from less than 40 deg. to above 150 deg. — by using different refrigerants in the secondary cycle.

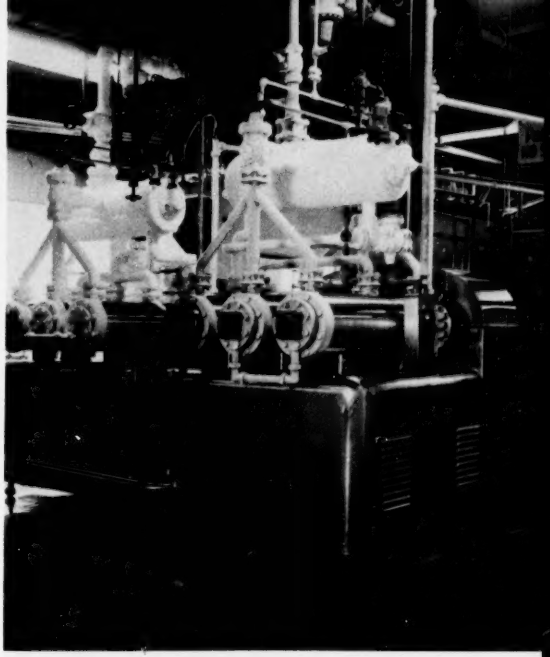
3. No steam or other outside source of heat is used — power supplied to the compressors is the sole energy source.

4. Condensate is fully recovered, making this system available for distillation and ester-recovery processes, as well as evaporation.

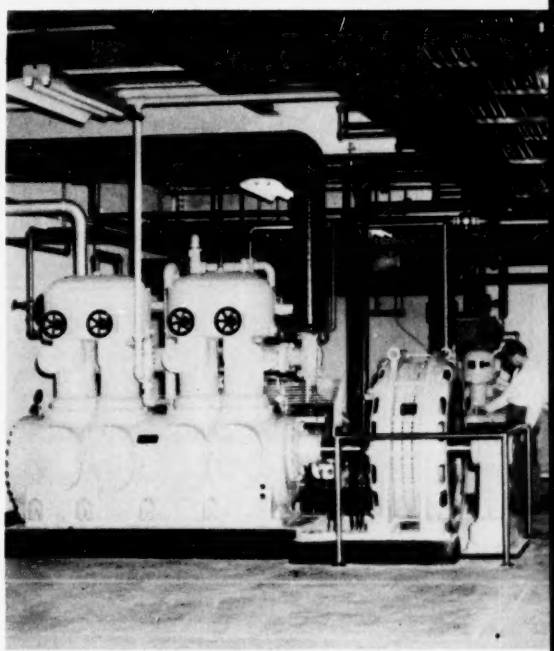
The transfer of heat from water vapor to a secondary vapor effects a tremendous reduction in volume. Vapor from water evaporated at 60 deg. has a volume of 1,208 cu. ft. per lb., and contains 1,058 Btu. of latent heat. If this vapor is condensed by transferring its heat to boiling anhydrous ammonia at 45 deg., the result is 1 lb. of water at 60 deg. and 2 lb. of ammonia vapor at 45 deg. The volume of ammonia will be only 7.2 cu. ft., its latent heat, 1,058 Btu. By taking a loss of 15 deg. in specific temperature, the volume of vapor to be compressed has been reduced from 1,208 to 7.2 cu. ft.

It would be impracticable to compress 1,208 cu. ft. of water vapor to salvage 1,058 Btu. But it is quite practicable to compress 7.2 cu. ft. of ammonia, with a temperature rise from 45 to 103 deg., to salvage 1,058 Btu. It can be done in moderate size commercial equipment with the expenditure of only 60 Btu. of mechanical energy.

Water is evaporated from orange juice at a rate of more than 4,000 lb. an hour in each of the first four units at Florida



KEY PIECE of equipment in process, the Votator continuously slush-freezes concentrated juice previous to filling into cans. Freezing is quickly completed by passing cans through air blast tunnel at —30 deg. F.



ESSENTIAL to the operation of the efficient low-temperature evaporator, refrigeration compressors "supply" heat to boil juice and cold to condense water vapor which boils off. They operate, in effect, as heat pumps. Above is a 300-hp. compressor. Four such units are used, plus a 700-hp. compressor.

QUALITY CONTROL at all stages of process is important factor in success. Here in the control laboratory are J. L. Heid and C. G. Beisel. A sample of the frozen concentrate is being reconstituted.

Citrus Canners Cooperative – 10,000 lb. per hour in a new larger unit. Three stages of forced falling-film evaporation are used, the three evaporators being of the shell-and-tube type. Water vapor from the juice is separated in flash drums connected to the base of the evaporators, and passes into a fourth shell-and-tube heat exchanger. Here it is condensed by boiling liquid ammonia at 41 deg. A two-stage noncondensable gas ejector on the latter exchanger maintains a pressure of approximately 0.25 in. abs. of mercury.

It is evident that the process is quite an achievement. And the product itself has attained distinction in a short time. It is becoming the pace-setter for the frozen food field. In some areas, its sales have been double the combined volume of peas and strawberries, for years the fastest selling frozen items. And sales are limited only by production capacity. Four or more companies will process the juice in Florida this year, and probably a dozen more plants will be in operation next year.

People in the industry conservatively estimate that 6,000,000 gal. of the concentrate will be sold this year. This is the equivalent of about 5,000,000 boxes of fruit, or 8 percent of Florida's total orange crop. So the frozen concentrate will materially help Florida growers, who have produced six bumper crops in a row to glut the market and ruin prices received by growers.

Top quality frozen concentrated orange juice has retailed at 25 to 30c. a can, which brings adequate return to grower and processor. Yet the cost to the consumer has been reasonable. Each 6-oz. can represents the juice from 4.3 lb. of fruit, which would cost the housewife between 26 and 43c. And consumers like the product because it saves time and effort in extracting the juice and cleaning the equipment.

The investment in plant and equipment to process a quality frozen concentrate is placed at about $1.00 per gallon of capacity per year. Makeshift modification of juice canneries will not permit the production of uniformly high grade products.

Proof of the importance of the low-temperature evaporator to the food industries in general is found in the list of companies which have installed, or have ordered, the unit. These include other citrus juice processors, a grape juice plant, a manufacturer of a broad line of foods, an insulin manufacturer, and a company which plans to condense eggs, if possible. And whole milk has been concentrated experimentally. There is little doubt that the list of commercial and experimental applications will grow rapidly.

It has been a long time since any single development in the food processing industry has had an impact so intense and so widespread as has the frozen concentrated citrus juice process.

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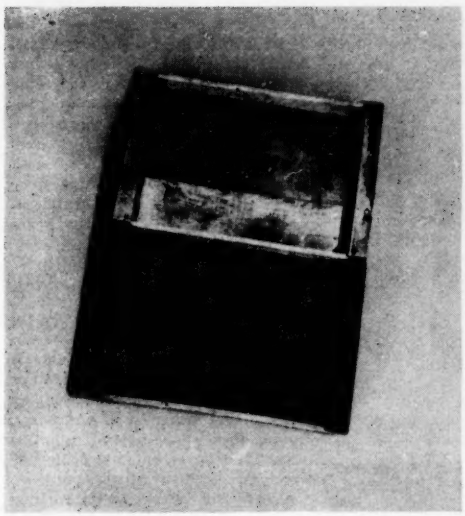
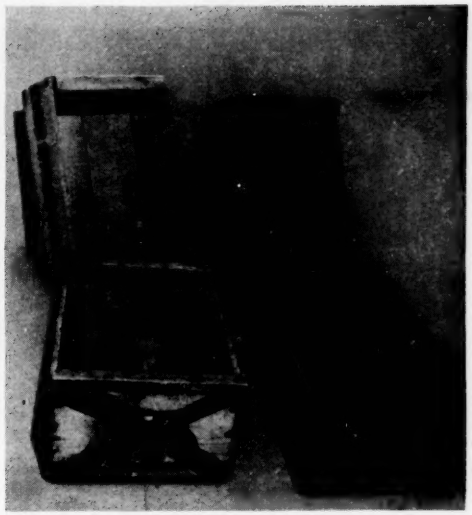




"WITH" vs. "WITHOUT". Left photo: Closeup of two boxes, after grueling use carrying tomatoes and olives, compares good condition of treated one (top) with deterioration of an untreated one. Right photo: Side and end studies further reveal how coated lugs can "take it." In foreground pair, resin-coated tomato-olive box is on left. The two lug boxes at rear (treated one is seen on left) were employed for carrying tomatoes alone.

Lug Boxes Preserved With New Resin Coating

Treated boxes repel moisture, stand hard usage, and keep free of slime and mold growths, also resist fruit staining and are easy to clean

FI STAFF

Tests made on lug boxes coated with a new, low-cost resin—Calresin #6-108—point to longer life, more constant tare weights, and stain-free and easily cleaned surfaces.

The boxes in question are used by fresh-fruit canners, freezers, dehydrators, and packers to transport produce from field to plant. While no actual count of these boxes is available, it is estimated that hundreds of thousands are in use.

Box losses sustained by individual processors have run from 5 up to 15 percent annually. Greatest percentage of these losses is due to general deterioration during winter storage and rigorous use during the harvesting season.

Various lacquers, paints, and varnishes have been applied experimentally as lug-box coatings. Most of them, however, have been turned down for failure to satisfy the stiff requirements—such as for wearing quality and resistance to moisture and growths.

An ideal coating will harden and seal the surface of the shook, making it more resistant to hard usage. And resistance to moisture is a "must".

Granted, the tests of the new coating conducted by a large western food canner may not be conclusive. But they do indicate that this coating acts as an excellent preservative and protection for boxes. The resin cover provides a seal that, in field uses, strikingly minimizes weight variations due to moisture pickups. And it also gives the boxes a hard, smooth surface that is highly sanitary and easily cleaned.

How Boxes Are Coated

One hundred new lug boxes were treated by immersion in Calresin for 40 to 60 sec.—this period being determined as most satisfactory in giving a proper impregnation and also allowing a free run-off when the boxes are drained immediately after dipping. The boxes were then allowed to dry at atmospheric temperature for a period of 48 hours.

All boxes were weighed before immersing them in the resin and after drying. There was an average gain in weight of 1.8 oz. per box, with a range of 0.3 to 3.8 oz. The smoothness or roughness of the shook, the grain of the wood, and other manufacturing differences, influenced weight variations. All boxes showed satisfactory penetration and coverage by the resin, when dry.

The amount of coating used per box was approximately 5 oz. Cost of dip-coating each box is not high. And since this test, there has been a reduction in the price of the new coating. Lower costs are promised in large scale dipping operations.

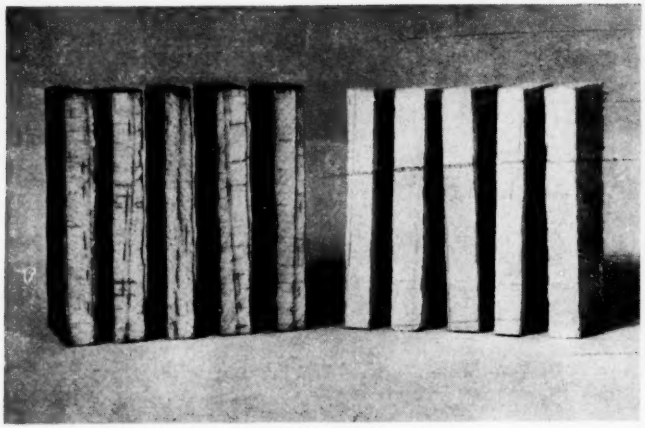
To facilitate identification, coated boxes were individually numbered and each end was painted with a green cross.

First Test and Results

Coated boxes and a like number of uncoated (control) boxes—all manufactured at the same time—were first used for tomato harvesting. Forty-five days after dipping, a number of the lug boxes were examined at the plant. The boxes had been in use for three weeks during the tomato harvest, making at least five round trips from the fields to the cannery.

All resin-treated boxes were found in good condition, with the coating intact except for a few small areas subject to hard impact. The nails were free of rust, and they still held the boxes

How Resin Works Into Wood



IMPREGNATION is graphically shown (left) in this comparison of treated and untreated shook sections. Tracer dye was put in resin to reveal penetration.

Coated Boxes Show Lower Weight-Gains

WEIGHT DATA on Coated and Uncoated Lug Boxes Before and After Use

(Weights in Ounces)	Average Gross Weight	Ranges of Weight Changes		Net Average Weight Gain or Loss	Percent Weight Gain or Loss
		Minimum	Maximum		
Unused					
New coated lug-boxes....	150.0	+ 0.3*	+ 3.8*	+ 1.8	+ 1.2
New uncoated lug-boxes..	148.0	.....	.....	.....	.....
After Tomato Harvest					
Coated lug-boxes.....	148.8	— 7.0	+ 5.0	— 1.2	— 0.8
Uncoated lug-boxes.....	155.2	.....	+16.0	+ 7.2	+ 4.8
After Tomato-Olive Use					
Coated lug-boxes.....	190.0	+28.0	+53.0	+42.0	+28.0
Uncoated lug-boxes.....	236.0	+62.0	+108.0	+88.0	+59.0

* Weight of coating.

firmly. There was no evidence of rot at any area. The boxes had been easy to wash. They were also clean and bright, with no tomato stains or adhering debris.

On the same day that this plant examination was made, a number of coated boxes were inspected in the field, and they proved to be in similar good condition.

Next, there was an examination of the untreated control boxes, which had undergone the same usage as the coated lugs. All nails were found rusty, and they were slightly loosened, as indicated by the fact that handholds, bottoms, and sides of these lugs would give slightly when the boxes were lifted under load. There was evidence of nail-hole rot, shown by darkened areas surrounding the nails. Furthermore, these boxes were stained with tomato juice. Also, dried seeds and skin fragments adhered to the shook.

Second Test and Results

Following the tomato season, all coated and control boxes were weighed and transferred to the company's olive plant, to be used for transporting olives from curing vats to size-graders.

This was a severe test for the lug boxes—for into them went olives dipped directly from curing vats containing a 10-salometer brine. During the olive season, this brine is continually being poured over the boxes as workmen transfer the olives. Uncoated boxes rapidly increase in weight due to the absorption of brine. Mold and slime accumulate on the surfaces of the shook. And, at season's end, the boxes are usually so badly rotted and weakened that they must be discarded.

After 30 days of use in the olive plant, coated and control boxes were examined. There was then an appreciable difference in color between the coated and uncoated lugs. The coated boxes retained their bright, clean appearance, with no evidence of mold or slime. Nails were still holding tightly and, while the boxes had increased in weight, the wood was not waterlogged and soft as in the case of the controls.

Under these unusual conditions, the resin-coated boxes showed weight increases that varied between a minimum of 28 oz. and a maximum of 53 oz. (see table). The average increase in the weight of these lugs was about 42 oz.

But, the untreated control boxes showed a much greater degree of brine absorption. Weight rises varied between 62 and 108 oz., with the average at about a plus-85 oz. These boxes were very dark in color, stained with fruit juices, and coated with a surface layer of mold and slime. Nail rot was progressing rapidly, and the boxes were becoming quite loose.

Cite Current Plans

While this serves only as an interim report, there is evidence that, in the treatment of lug boxes, the new resin is highly preservative and that notable moisture resistance is provided. For the current 1949 season, this company plans to coat a number of new boxes, dipping them at the time of manufacture. These boxes will have distinctive markings.

A record of repairs and a running account of the condition of these coated lugs will be kept throughout the season. Other plans include the coating of lugs used for handling hand-cut apricots and the double-coating of the boxes used for brine-stock olives.

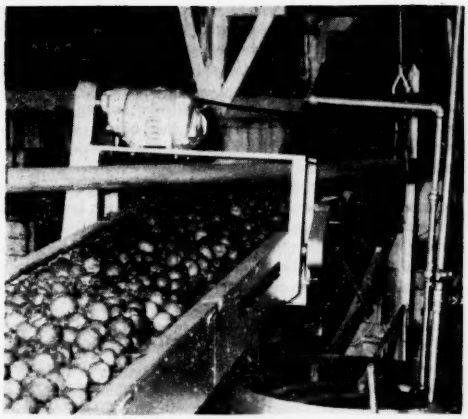
Calresin Corp., Culver City, Calif., maker of the new resin, is now promoting uses of the coating on other containers employed for handling foods.

For example a series of tests is being made on resin-coated strawberry hallocks that contain a highly moisture absorbent wood. Big difficulty is the absorption of fruit juice and adherence of fragments of the fruit to the hallocks, resulting in a condition ideal for mold growth, especially during humid weather. With use of the new coating, growers and processors expect to achieve a hardening and sealing of the surfaces of the hallocks. Any material adhering to the treated hallocks should readily wash off, and moisture absorption is seen minimized.

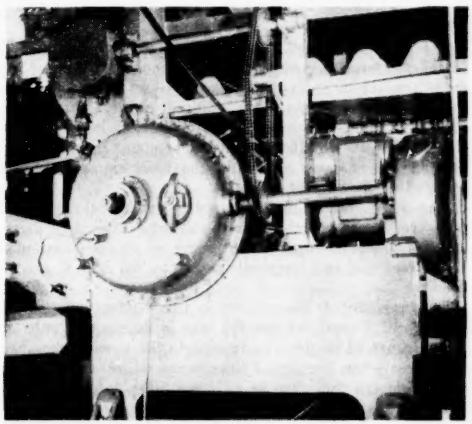
Other Crate and Tray Uses Seen

Other tests are under way in the milk industry. In one test, resin-coated milk crates were washed 50 times in an alkali solution. Yet, the crates did not pick up moisture. The surfaces of the coated crates were hardened and sealed so that they did not deteriorate when stored in coolers immediately after they were washed.

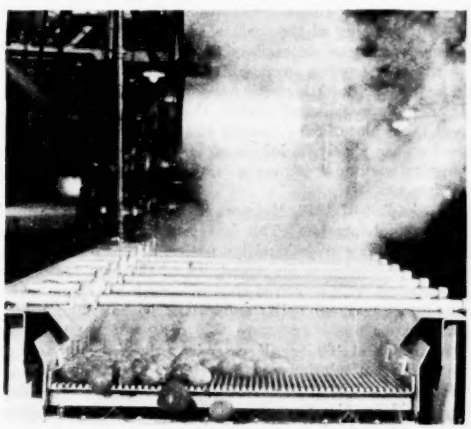
Still other tests are being conducted by dehydrators. Problem facing them is that odors are picked up by their wooden dehydration trays from onions, garlic, and similar foods. Hence, trays used for one product cannot feasibly be reused for another. Accordingly, the dehydrators have turned to resin-coating as a possible solution, and the results thus far look promising.



1 **TOMATOES** coated with lye film go from wire-mesh belt to elevator of rotary steamer.



2 **THEN PRESSURIZED** steam in the rotary unit removes lye-filmed skins from tomatoes.



3 **AND PEELED** tomatoes are cleared of last traces of lye by water sprays in this shaker-washer.

New Type Lye-Peeler Does the Job Better

Quality and yield up, labor saved, using method in which fruits and vegetables are filmed with caustic and pressure-steamed

ROBERT W. KILBURN and FRANK D. HICKEY
Chemists, Central Research Department,
Food Machinery & Chemical Corp., San Jose, Calif.

Greater efficiency in commercial lye peeling of fruits and vegetables is now being attained through use of a new method. It consists of spraying a film of lye solution over the product—rather than immersing it—and subsequently exposing the product to steam under pressure in a closed vessel.

In successful operation at the Matmore Canning Co., Woodland, Calif., the new system overcomes disadvantages previously encountered and considerably broadens the scope of the lye process in the cannery.

Peeling is an essential step in the preparation of foods for canning. Lye peeling is the most widely used procedure in fruit canneries. The skins of many fruits and some vegetables are easily decomposed by the action of a hot lye solution.

Decomposition is accomplished by chemical reactions of sodium hydroxide with various components in the skins. The rate at which the decomposition takes place depends upon the relationships of such factors as temperature, concentration of lye in the solution, and composition of the peel.

Peel composition varies among individual fruits of the same variety due to differences in maturity and cultural conditions. Thus a problem is posed in the use of the standard lye peeler.

For instance, under certain conditions of time, temperature and lye concentration, part of the fruit in a lot will be peeled and the remainder will still be unpeeled due to differences in maturity.

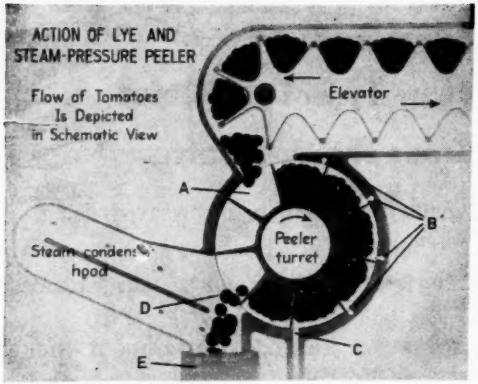
And if temperature or concentration of lye is increased in order to peel the entire lot, part of the fruit will then be overpeeled, with a resulting loss of product and pitting of the surface. The edible flesh is subject to the same chemical reactions with lye as the peel, and the decomposition does not stop until the fruit is removed from contact with the lye.

Other Difficulties

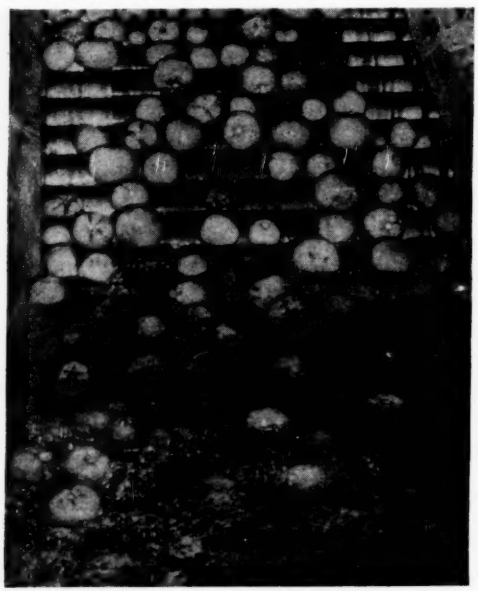
There are additional problems in the use of the conventional method. The heat from the hot lye solution cooks the surface of the fruit to a depth of $\frac{1}{8}$ in. or more, depending on the time and temperature conditions. This breaks down the cellular structure of the fruit, softening it.

In the case of such products as freestone peaches and apricots, a considerable amount of this soft layer is lost when the fruit is washed and handled subsequent to peeling.

Breakdown of the cell structure releases the juices so that sugar, acids, and flavor components leach out of the cooked layer during washing, thus lowering the quality of the product. Enzymes released by the rupture of cells cause



4 **HOW PEELER** operates continuously. Elevator slides tomatoes into loading pocket (A). Steam enters peeler shell through ports (B), and leaves at (C). Tomatoes discharge at (D) into washer (E).



5 **MINIMIZING** of bruising is primary in maintaining quality in tomatoes. Note how gently tomatoes are transferred from wash tank to live roller-conveyor.

the peeled fruit to darken if it stands around before it is processed.

Improvements in the standard lye peeler during the past 40 years have been generally of a mechanical nature. Means for conveying the fruit and applying the lye solution have been simplified, and instruments for controlling the temperature and concentration of the solution have been added.[1,3] Attempts have been made to overcome the limitations of the standard method by speeding up the rate of reaction of the lye solution on the peel.[3,4] Of the factors involved in the rate of reaction, temperature is the most important.

As the temperature is increased, the disintegration of the peel takes place in a much shorter time. For example, several minutes would be required to remove the peel from peaches with a lye solution at 150 deg. F., whereas the standard operating temperature of about 210 deg. F. does the job in 30 to 60 sec. At a temperature of 290 deg. F., the skin is removed in about 6 sec.

The temperature to which the lye solution can be heated in the standard peeler is limited by the boiling point of the solution. For instance, the Mazzola process[4]—based on the immersion rather the new film principle—utilizes temperatures up to 300 deg. F. by employing very high lye concentrations with high boiling points. A 50 percent lye solution is required to operate at a temperature of 290 deg. F.

This process overcomes one of the limitations of the standard lye peeler because the very rapid decomposition of the skin limits the penetration of heat into the product to a negligible layer on the surface.

Use of hot, concentrated solutions is, of course, hazardous, and fumes are very irritating. The method also has several defects common to the standard peeler. Conditions must be carefully controlled or the surface of the product will be rough and pitted due to over-peeling. Lye solutions in both peelers become fouled with organic material from the decomposed skins, and the solution must be discarded periodically and a fresh charge added.

Details of Operation

In the new method, developed by Food Machinery & Chemical Corp. and employed at Matmore, the film of lye coated on the product in the closed vessel rapidly reaches the temperature of the surrounding steam and the skin is disintegrated in a few seconds. Since the lye in actual contact with the product is only that amount present in the film on the surface, action on the flesh exposed by the removal of the skin is slight.

The speed at which the produce passes through the pressured steam chamber is controlled by a variable drive. An instrument controls the pressure of steam maintained in the machine, and temperatures up to 300 deg. F. can be used.

Temperature of the process is independent of the lye concentration used because the heat is determined only by the pressure of steam introduced into the peeling chamber. The three prime factors of time, temperature, and lye concentration can therefore be adjusted independently to give optimum results for the product being run.

Again peeling is accomplished so rapidly that penetration of heat into the product is limited practically to the skin itself, and thus a firm peeled product is produced. A cannery trial on apricots demonstrated that loss of product due to softening of the surface can be materially reduced by use of the new steam-chemical peeler.

In the new system, contamination of the lye solution (as in a standard unit) is another limitation which is overcome. In the steam-chemical peeler, the disintegration of the peel takes place in the steamer and the lye solution can be used up completely. Addition of fresh material is necessary only to maintain a proper amount of solution in the equipment.

In the fall of 1948, Matmore installed a full commercial line to peel tomatoes. This is a product which cannot be peeled by the conventional lye peeler, hence this cannery's operation illustrates the versatility of the new equipment.

Tomatoes were conveyed on a wire-mesh belt, from which inspectors removed splits and rots. The belt then passed into an enclosed box where thin sheets of a 20 percent lye solution at 190 deg. F. cascaded briefly over the product. This hot solution moved surface wax and left a complete film on the fruit surface.

To aid lye-film formation, a small amount of wetting agent was added to the solution. Excess lye draining through the belt was caught and recycled.

Coated tomatoes with the skins still intact were trans-

ferred from the belt into the steamer elevator. This transfer from a horizontal belt to the inclined elevator was quite gentle, the tomatoes dropping only a few inches over the end pulley onto a metal chute, from which the fruit slid into the elevator's buckets. The buckets were self-leveling due to the incline, and excess tomatoes rolled back into the next pocket.

Action of the peeler is illustrated in an accompanying schematic drawing. The down turn of the elevator buckets slides the tomatoes into the loading pocket at the top of the turret valve. The motion of the turret opens the first steam port through the cylindrical shell immediately after the loading and air is purged from the partially open pocket. As soon as the motion of the turret closes the pocket, the pressure of the steam rises to the pressure maintained in the manifold.

Other entry ports through the shell introduce steam to maintain this pressure as the pocket passes. At the bottom of the shell, a blow-down port allows the steam to escape to a condenser. Condensate in the pocket, containing most of the unneutralized lye, passes to waste with the steam. The pocket then reaches the discharge opening and the tomatoes drop into the washer. Water sprays in the steam hood condense low pressure steam, which discharges with the peeled tomatoes.

Skins are removed in the turret by the combined action of the steam and the lye and come out in small fragments mixed with the peeled tomatoes. The function of the washer is to remove all traces of lye remaining on the surface of the fruit and to eliminate the peel fragments.

The best washer for tomatoes is the conventional type consisting of a water tank into which the tomatoes fall, with an inclined roller-conveyor to carry the tomatoes from the tank to the canning line. Water sprays over the roller elevator remove particles of peel from the rolls and the peeled fruit.

After delivery to the Matmore packing belt, the tomatoes were cored by means of a mechanical device and placed in cans. Since only fancy grade was packed, the defective tomatoes (such as green butt, sunburn, and scarred fruit) which remained on the belt after passing the packers, were chopped and sent to byproducts. This fruit could have been trimmed and packed under a lower grade.

Production Figures Compared

The plant also operated a conventional canning line using tomatoes from the same belt that fed the steam-chemical peeler. Fruit was blanched in an atmospheric steam box and the skins were removed by hand after coring. Near the end of the season, both peeling lines were completely equipped with mechanical coring devices so that direct comparison of production rates could be made.

Average production per worker per shift was 62 percent higher on the steam-chemical peeler line than on the conventional blanch line.

This higher production rate agrees very closely with the study made by Purdue University.[5] This report lists the results of a time study made of a manual peeling and coring operation from the time the tomato is reached for until the finished product is dropped into the container. Of this cycle, 55.6 percent of the time is used in removing the skin and 23.7 percent is required to remove the core.

In these tests, the core removal was speeded by use of a mechanical device, and this shortened the entire cycle and thus increased the percentage of the time required to remove the skin from blanched tomatoes.

Defects Noted More Easily

Selection for various grades is much easier on the steam-chemical peeler line because various defects such as off color and white spots, which are readily visible in peeled fruit, are difficult to detect in the unpeeled tomatoes. Considerable lost motion is eliminated because the packers can select the best for canning processes and the other tomatoes that pass on to byproducts are thus the ones which would require the most time to prepare. For best results, only firm, whole tomatoes should be run through the peeler.

An ingenious belt arrangement, devised by the plant superintendent at Woodland, automatically eliminated mashed and broken fruit by utilizing the ability of whole fruit to roll. In this way, sorting labor was greatly reduced, because only a small crew of inspectors was required to remove splits and rots (amounting to about 5 percent of the volume of tomatoes going to the peeler).

Fruit which had been trimmed for mold was not run through the peeler, the object being to prevent loss of juices and solids from broken fruit during passage through the peeler and washer. Such fruit is not generallly suitable for canning anyway.

Several lots of San Marzano or pear tomatoes were peeled and canned. Labor savings of the steam-chemical peeler were considerably higher with this variety than in the case of round tomatoes because of the smaller size. This year, the cannery plans to run apricots, freestone and clingstone peaches as well as tomatoes through the peeler.

Products of a wide variety—not only apricots, freestone and cling peaches, but also apples, Imperial prunes, plums, nectarines, grapes, tomatoes, onions, Anaheim chili, Bell peppers and root crop vegetables—have been successfully peeled in the laboratory and in cannery trials. Savings in labor costs, material costs, or both, are expected in commercial applications.

It may be added that preliminary studies with respect to DDT spray residues on apples appear to indicate that the DDT is decomposed, along with the peel, and removed in the subsequent washing operation.

See High Versatility

It is apparent from the list just given that the process is very versatile. The machine is designed to peel 12 to 20 tons per hour, depending upon the product being run. In comparing the steam-chemical peeler with the standard lye peeler, the higher quality and increased yield resulting from the more rapid peeling job are considered the most important factors.

For products such as tomatoes, the comparative economics involve contrasting the hand labor charges with costs of lye, steam, operation-maintenance and depreciation on the machine. Since these costs are moderate, the labor savings, demonstrated in the cannery run, represent an appreciable increase in profit.

Use of this machine and process is indicated where high capacity and versatility are required, or where the product resists other mass peeling methods, or where these methods produce low yield. In some instances, continuous high-pressure steam peeling without the lye filming will fulfill requirements, as in the case of carrots and potatoes if these are the only products packed. Where higher capacities than 4 to 5 tons per hour are required, or where storage or maturity conditions render the product resistant to steam peeling, the new process may be used.

For efficient operation, the machine requires a supply of dry, saturated steam at 100-psi. line pressure. Minimum steam capacity requirement is 30 boiler hp. Control of the steaming operation is simple and rapid; temperature and time of exposure can be changed in a matter of seconds without stopping the line. Exposure time may be varied from 4 to 20 sec., and steam temperatures from 220 to 310 deg. F. may be used.

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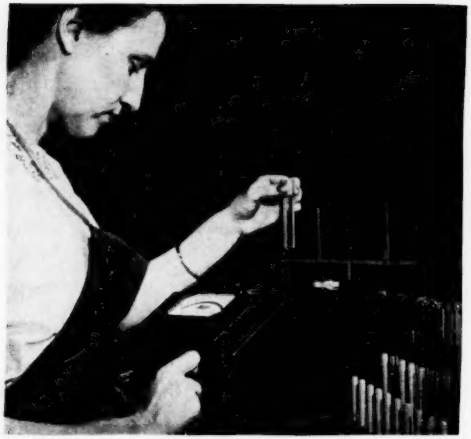

INSTRUMENTS for measuring pigment content of asparagus are colorimeter (left) and spectrophotometer (right).

New Method Gives Rapid Gage of Asparagus Color

Practical data that check with organoleptic ratings are now supplied by measurement of green pigment in raw, canned, or frozen product

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Color is of high importance in judging the quality of asparagus. With the exception of factors that may be classed as defects, color is the only quality consideration in the grading of raw asparagus*.

For the canned and frozen product, a description of the color is second in importance only to the style of pack. It is obvious, therefore, that an objective method of color measurement—one which will define these color descriptions in physical terms—is very much needed.

Now, by the use of a new objective method, it is possible to: (1) Define in physical terms what is "green" asparagus and what is "white" asparagus, and (2) provide a method for the objective measurement of differences in the degree of greenness among lots of green asparagus.

The method is based on the transmittance of light at 665 millimicrons (10^{-6}mm.) through asparagus pigment extracts.

Possibility of using a Beckman spectrophotometer for the colorimetric evaluation of asparagus pigment extracts was investigated. Preliminary work indicated that good differentation may be obtained for acetone-extracted green pigment at the 665 millimicron-wave length.

The following samples were prepared to see whether such an extraction method reflects visual color values: Asparagus stalks, cut into 1-in. pieces, were then carefully sorted visually into nine sequential lots. Lot 1 was the greenest. Lot 2 to 7 contained pieces that were gradually lighter green in color. Lot 8 consisted of borderline pieces—between white and green. And Lot 9 had white pieces.

After these samples were extracted with acetone, their green-pigment transmittance was measured by the spectrophotometer. Results (see Table I) indicate that this method of determining the color of asparagus agrees closely with organoleptic evaluations—a practically perfect correlation.

About the Procedure

The new method was developed during the preliminary studies. It has been used to analyze over 200 samples of fresh, canned, or frozen asparagus prepared in Maryland, Delaware and New Jersey. The procedure comprised:

1. Standardizing of the color instrument with a known solution of chlorophyll dissolved in acetone.
2. Blending to a uniform pulp 100g. of asparagus with 100g. of water in a Waring Blendor.
3. Weighing 20g. of the mix, transfering it to the cup of a Waring Blendor with about 70ml. of acetone, and blending for exactly 5 min.
4. Transfering the mix to a 100 ml. graduated cylinder, and making-up (to 100ml.) with acetone.
5. Stirring the mixture thoroughly in the cylinder, transfering part of it into a centrifuge tube, and centrifuging for about 10 min. at 2,000 rpm.
6. Measuring the transmittance of the clarified pigment solution in a suitable instrument at the spectral band centered about 665 millimicrons.
7. Converting percent of transmittance to ppm. of chlorophyll.

The Beckman spectrophotometer provides a wide range of values because of the possibility of narrowing the band of light to 5 millimicrons or less. However, it is not absolutely necessary to use this or any spectrophotometer, since the chorophyll content in asparagus is sufficiently high so that any filter type of photoelectric colorimeter may be suitable. But the light source must be strong enough,

* *U. S. Standards for Green Asparagus for Canning and Freezing.* Mimeog. Reissued Feb. 3, 1948, Washington, D. C.

and the filter must be sufficiently narrow and centered about a wave length of 665 millimicrons.

Since the Leitz photoelectric colorimeter met these requirements, it was used as an alternate instrument in these laboratory studies. And it was used exclusively in the field with satisfactory results. A comparison of values obtained from these two instruments and their relation to chlorophyll values are presented in Table I.

"Borderline" Value Is 10 ppm.

No attempt was made to determine relative greenness of asparagus samples from day-to-day.

In general, it appeared that the objective values were closely related to organoleptic color evaluations. Although the intensity of the green color of raw asparagus may be important, the determination of what is and what is not "green" is even more important.

Growers of asparagus often question just where the "green" ends and the "white" begins, especially during cool weather, when the intermediate zone may be purple. Since the objective method measures the green pigment only, independently of the presence of other pigments, this point could be determined easily. It was found that "borderline" samples with only a faint tinge of green ranged from 16 to 19 ppm. of chlorophyll. Those samples which were unquestionably white ranged from 3 to 8 ppm of chlorophyll.

Therefore, it was concluded that the level separating green color from white would fall at approximately 10 ppm. of chlorophyll. In terms of transmittance, at 665 millimicrons, this value would represent 91 percent for the Beckman spectrophotometer, and 94 percent for the Leitz photoelectric colorimeter. Thus, a segment of asparagus that contains less than 10 ppm. of chlorophyll may be considered white.

In regard to the confusing purple zone, these studies indicate that, in general, the green pigment starts about one inch, in the direction of the tip, from the basal point at which the purple color begins.

The next question to be answered was: To what extent will objective measurements of the green pigment of raw asparagus reflect the intensity of the color of the canned and frozen product? Accordingly the green pigment values of the raw asparagus, calculated in terms of ppm. of chlorophyll, were correlated with organoleptic ratings of the canned product. The resultant of 0.69 indicated that while the correlation is highly significant, it is not sufficiently high to be used with confidence for prediction purposes.

Factor of Duration

Closer examination of the data indicated that the factor of duration of storage was responsible for the poor correlation. Apparently, the loss in green pigment occurring in the raw product as a result of storage was not reflected in the organoleptic ratings of the canned product.

Thus, for example, a sample of asparagus which was analyzed immediately after harvest contained 195 ppm. of chlorophyll. Upon holding for four days at 70 deg. F., the chlorophyll content of this material was reduced to 93 ppm. Upon canning, the organ-

(Turn to page 190)

Pertinent Pigment-Test Data Contrasted with Organoleptic Ratings

TABLE I—Green Pigment Contents, Determined by Spectrophotometer and Colorimeter, Are Compared With Organoleptic Color Values

Organoleptic	Percent Transmittance Through— Beckman Spectrophotometer	Leitz Colorimeter	Chlorophyll (ppm.)
Lot 1 (From dark green to light green)	30.5	58	144
Lot 2	35.0	61	126
Lot 3	45.1	67	95
Lot 4	58.0	74	64
Lot 5	60.4	76	60
Lot 6	69.3	81	43
Lot 7	73.6	83	36
Lot 8 (border)	84.1	89	19
Lot 9 (white)	97.5	98	3

TABLE II—Correlation Coefficients Between Objective Color Values for Raw Asparagus and Organoleptic Ratings for Canned Product, Also for Objective and Organoleptic Ratings for Canned Color

Correlation Between Objective Values of Raw Asparagus and Organoleptic Ratings of Canned Product	
All samples	0.69
3 days' storage	0.87
5 days' storage	0.89
7 days' storage	0.90
Correlation Between Objective and Organoleptic Ratings of Canned Product	
All samples	0.90

TABLE III—Effect of Plant Parts, Storage, and Temperatures on Green Pigment Content of Raw Asparagus and on Organoleptic Ratings of Canned Asparagus

Effect of Plant Parts	Series I Green Pigment (ppm. chlor.)	Series I Organoleptic*	Series II Green Pigment (ppm. chlor.)	Series II Organoleptic*
4½-in. tips	124.0	8.6	129.0	9.2
1st cut	59.0	5.9	66.0	7.1
2nd cut	46.0	4.3	57.0	6.3
3rd cut	...	...	46.0	5.4
Snaps	119.0	7.7	102.0	8.6
Effect of Storage Duration				
1 day	129.0	6.9	88.0	7.3
3 days	119.0	6.8	90.0	7.5
5 days	64.0	6.3	79.0	7.6
7 days	48.0	6.5	62.0	7.5
Effect of Storage Temperature				
32 deg. F.	105.0	6.5	84.0	7.6
50 deg. F.	88.0	6.7	76.0	7.3
68 deg. F.	91.0	6.7	....	...
86 deg. F.	78.0	6.3	....	...

*Scale: 10 equals deepest green color to 1 equals white.

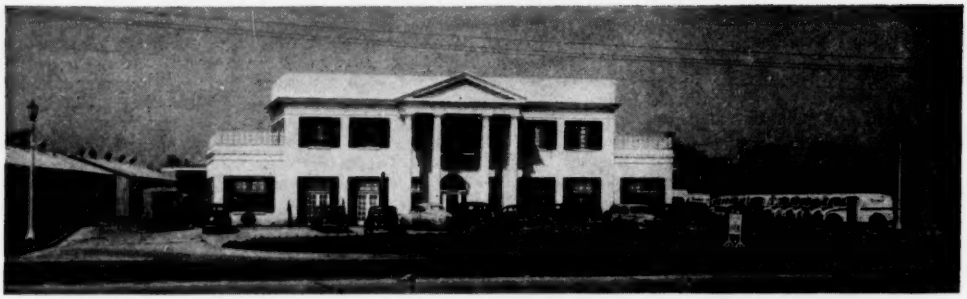
TABLE IV—Relation of Green Pigment Content of Canned Asparagus to Organoleptic Evaluations

Organoleptic Evaluation	Green Pigment (ppm. Chlorophyll)
1. White	8
2. Borderline	16
3. Very light-green	24
4. Light-green	30
5. Medium light-green	37
6. Medium-green	44
7. Medium deep-green	54
8. Deep-green	67
9. Very deep-green	96
10. Deepest-green	122

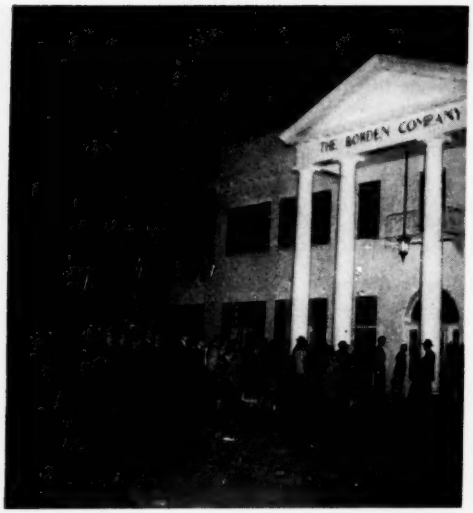
TABLE V—Effect of Canning and Freezing, also Cooking of Frozen Product, on Green Pigment Content of Asparagus

Days of Storage	Deg. F.	Green Pigment (ppm. Chlorophyll) Raw	Canned	Frozen	Frozen & Cooked
2	32	182	92	143	106
2	50	142	98	118	116
2	68	204	81	121	102
2	86	107	96	113	87
4	32	185	96	131	105
4	50	79	81	...	...
4	68	93	72	104	85
4	86	74	77	74	80
6	32	180	82	130	120
6	50	70	63	102	92
6	68	47	55	85	75

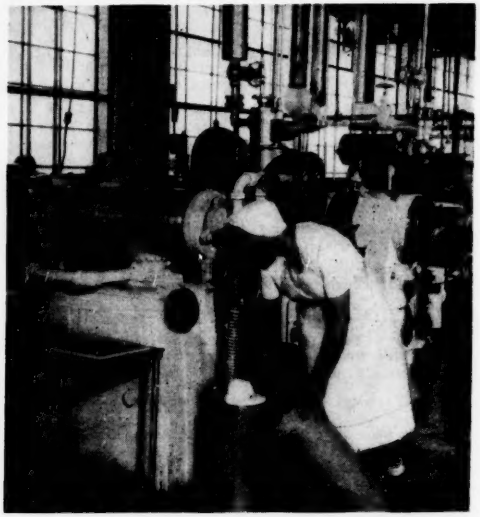
Attractive Highway Plant Is Borden's Latest in South



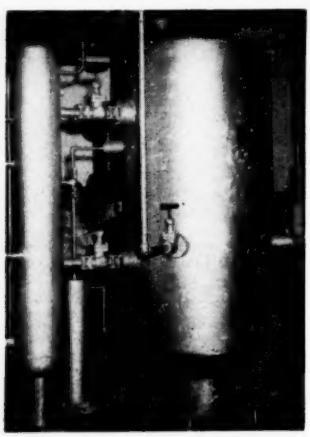
1 **LARGE** southern-colonial style plant now houses Borden's milk and ice cream manufacturing facilities on travel-heavy Airline Highway outside New Orleans. Structures on left afford 9,200 sq. ft. of warehouse space.



2 **OVER** 30,000 people inspected plant during first week. Restaurant and ice cream fountain are features.



3 **CONTINUOUS** freezers in ice cream department exemplify modern equipment employed in plant.



4 **DESUPERHEATER,** new engine-room unit, improves refrigeration.

Dairy Industry Developments

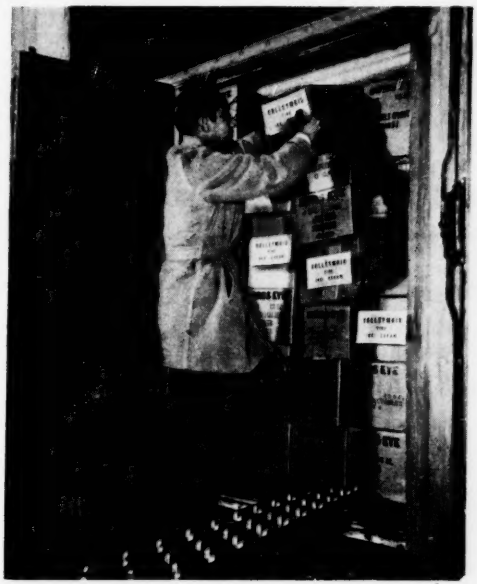
Modern, attractive roadside processing plants near metropolitan areas spark a trend . . . New method of store deliveries of ice cream also noted

WITHIN the last few years there has been a growing tendency for dairy companies to move their manufacturing plants from the crowded metropolitan areas to attractive spots outside the city along a well-traveled highway. Such moves afford room for expansion as well as more healthful locations.

Most recent example is the opening of Borden's new fluid milk and ice cream plant along Airline Highway outside New Orleans. This location makes it possible for the firm to serve the area's 721,000 population conveniently and also run a profitable retail store. The main building—a modern two-story plantation type structure—has been erected on an 18-acre site with a 395 ft. frontage. Be-

Ice Cream "Go Along" Plan Cuts Valleymaid's Costs

1 **IN SYSTEM** adopted by Valleymaid Creameries, Los Angeles, ice cream comes off same line as other frozen foods—for all go out together in single, economical delivery to markets that phoned orders previous day.



2 **WORKING** on the orders, trucks are filled to door. No space is wasted for reach-in. And left-overs are "out."

3 **TIME AND LABOR** are saved because the grocer gets everything in one call—ice cream along with the rest.

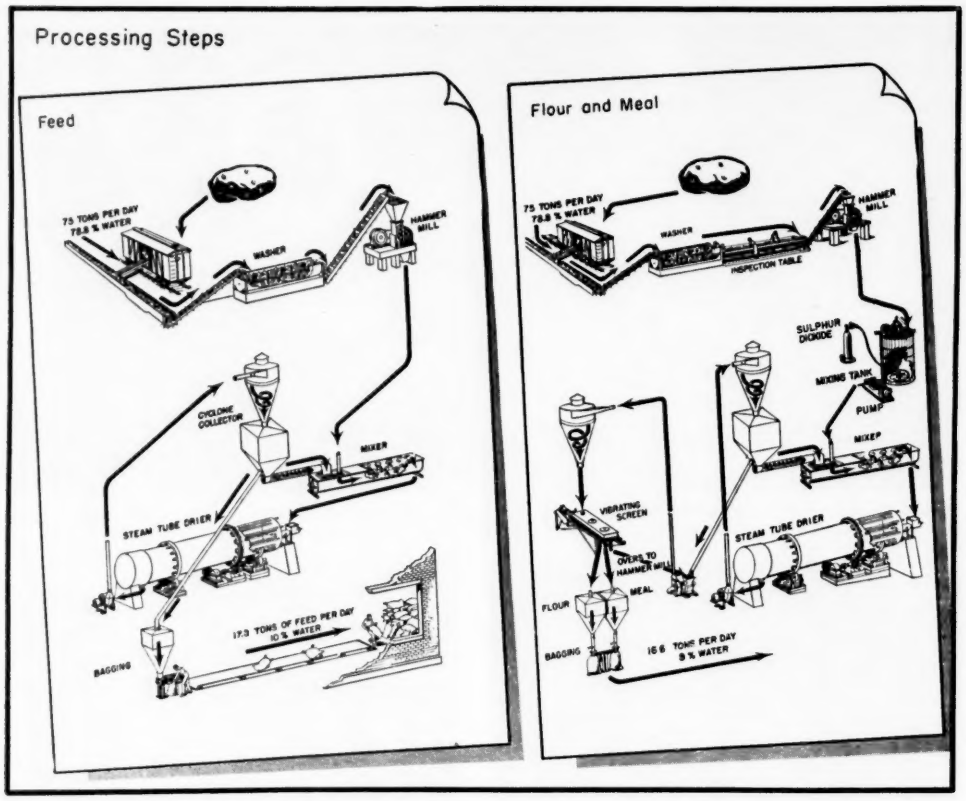
sides being an architectural showplace, the new plant is equipped with the latest improvements of dairy design and development.

Delivery Development

Meanwhile, Valleymaid Creameries in Los Angeles is breaking away from the old school by establishing a new method of ice cream marketing.

This company handles ice cream as a standard food item rather than as a specialty. Accordingly, it combines ice cream with its frozen food deliveries. By filling trucks to capacity with prepackaged orders and by cutting down time-wasting store-door calls, efficiency has been upped while cost of marketing has been considerably reduced.

According to the "one-stop saver", as the plan is called, the grocer telephones his ice cream and frozen food orders the day prior to delivery. Valleymaid Creameries then makes up orders and delivers them—like any other frozen food—on a drop-shipment basis. Store personnel places the merchandise in display or storage cabinets.



Making Potato Flour, Meal and Feed at Low Cost

Heavy export demand and surplus crops make steam tube methods for drying white potatoes attractive to a wide segment of the food industry

LOW-COST methods for converting white potatoes to feed, flour and meal recently reported by the Eastern Regional Laboratory, may provide at least a partial solution to the recurring crop surpluses. These processes are particularly welcome in a year in which the Commodity Credit Corp. is asking for about 448,000,000 lb. of potato flour and meal for export, as against a normal annual production capacity of only about 35,000,000 lb.

Production of Feed

The process described here is taken from a report by Paul W. Edwards, Clifford S. Redfield, Albert Hoersch, Jr., and Roderick K. Eskew, of USDA's Chemical Engineering Division. The equipment must handle 75 tons of potatoes in 24 hours, producing 17.31 tons of feed containing 10 percent moisture. The yield figure is based on a 2 percent loss.

Washing: The potatoes are generally conveyed from freight cars or storage bins into the plant by water in a flume. First, they pass to the washer, a U-shaped trough divided into sections and equipped with rotating paddles which keep the potatoes in rapid motion and lift them from one compartment to the next. The stones and much of the dirt settle in the bottom of the trough and are periodically removed by flushing.

A four-compartment trough approximately 2½ ft. in diameter and 25 ft. long will properly wash at least 75 tons of potatoes in 24 hours, using about 25 gal. of water per minute.

Grinding: To reduce the potatoes to a form suitable for drying, they are ground in a hammer mill equipped with a screen having ¼ in. holes. Ordinary blunt hammers may be used. One mill 6 in. wide by 12 in. in diameter driven with a 7½ hp. motor, should have sufficient capacity. The mill should give a hammer tip speed of about 6,500 ft. per min. Tip speeds much higher may require a coarser screen.

Mixing and Drying: The ground potatoes will contain on the average 21.2 percent solids and 78.8 percent moisture. To prevent the material from sticking to the tubes of the drier, the moisture must be reduced to about 43 percent. This is accomplished by continuously recycling a sufficient quantity of the dried product and mixing it with the moist feed.

It is important that the dry product and the ground potatoes be mixed thoroughly before they enter the drier. A paddle-type mixer-conveyor 2 ft. in

diameter and 20 ft. long and driven by a 3-hp. motor should be satisfactory. A sufficient quantity of dried material must be provided before the drier is put into operation. Thereafter, recycling 1.1 lb. of the dried product containing 10 percent moisture per pound of ground potatoes containing 78.8 percent moisture will maintain a moisture content of 43 percent going to the drier. A steam tube drier handling this product will evaporate about 1.4 lb. of water per square foot of tube heating surface per hour, when steam is used at a pressure of 100 psi. Thus for a factory of this size, approximately 3,600 sq. ft. of tube heating surface will be required. This can be obtained by using two steam tube driers 6 ft. in diameter by 35 ft. long.

Bagging: That portion of the dried material not required for recycling is drawn off and bagged. Ordinary paper shipping bags, each holding approximately 100 lb., may be used. The product is a dark granular material suitable for feed. It has a bulk density of about 45 lb. per cu. ft.

Alternate Method: It might be asked why the ground potatoes could not be pressed to reduce drying costs. Although such a step is entirely feasible (if about 0.8 percent lime is added), it is not generally desirable because the press effluent may constitute a steam contamination problem.

Furthermore, up to 20 percent of the total solids in the potato may be lost in this effluent, a loss that would more than offset any economy in drying. Although some of the insoluble solids in the effluent might be recovered by settling, cost calculations indicate that it is cheaper not to press.

Flour and Meal

The same basic method described for the production of feed can be adapted to the production of potato flour and meal. This product will be slightly more cream colored than the highest quality potato flour made from cooked, peeled potatoes. It compares favorably with flour now being produced commercially, with drum driers, from cooked unpeeled potatoes.

The various steps are the same as those described for the production of feed, with the following exceptions:

Because the product is to be used for food, the washed potatoes have to be sorted to remove spoiled parts. Sulphur dioxide should be added to the ground potatoes to maintain a good color, and the moisture content must be reduced to not more than 9 percent. The dried product must also be ground and screened to produce flour or meal.

The sulphur dioxide required to maintain the color is not more than 0.2 percent of the wet weight of the potatoes. It is believed that in most cases less than 0.1 percent would be sufficient. The sulphur dioxide treatment can be carried on effectively in a wooden tank, 4 ft. in diameter and 5 ft. high, equipped with a bronze turbine-type agitator. The sulphur dioxide can be fed continuously through a flowmeter at a rate commensurate with the rate of ground potatoes entering the tank.

Since the average retention time is about half an hour, the tank also serves as a reservoir to equalize discrepancies in operating rates. The ground potatoes are delivered from the tank to the mixer by a positive delivery pump.

The moisture content must be reduced in the drier to not more than 9 percent. A drier handling this product will evaporate about 1.3 lb. of water per square foot of tube heating surface per hour, when steam is used at a pressure of 100 psi. Two driers, 6 ft. in diameter and 35 ft. long, each having an evaporative area of 1,800 sq. ft., will handle 75 tons of potatoes in 24 hours, making 16.6 tons of product. The lower yield of flour, as compared with that of feed, results from a higher loss of solids (5 percent) in the preparation of the food product and from its lower moisture content.

Strain On the Stack

When mixed with 0.2 percent sulphur dioxide, the ground potatoes have a pH of about 4.6. Some of the sulphur dioxide driven off in the drier will be dissolved in the water that condenses in the drier stack. This will result in corrosion of the stack if it is not constructed of metal resistant to sulphur dioxide. Manufacturers who propose to use this process beyond the present demand for low-cost flour should replace the stack, when required, with one constructed of such metal.

To produce flour and meal, the dried product must be ground in a hammer mill. As in the production of feed, the size of the holes in the hammer mill screen and the speed of the mill will be governed in part by the relative proportions of meal and flour desired. The choice may also be influenced by the moisture content and friability of the product.

The ground product must be screened. A vibrating screen driven by a 3-hp. motor and equipped with 30-mesh and 70-mesh screens each 6 ft. long and 3 ft. wide, should be satisfactory. The ground product is fed to the 30-mesh screen, which is placed over the 70-mesh screen. Material passing through the 70-mesh screen is flour; that held on it is meal. The portion that does not pass through the 30-mesh screen is returned to the hammer mill.

For an investment of approximately $87,500, 16.6 tons per day of potato flour or meal containing 9 percent moisture can be produced, at a cost of about $39 per ton. This figure includes all costs, except that of the potatoes and sales expense for the product. This is considerably below the cost of producing potato flour by conventional means.

Other Methods

Should a lighter colored flour be required for domestic use, it can be made by drying in two stages (two driers in series) using steam at 100 psi. in the first drier and at 50 psi. in the second. Obviously, peeling the potatoes would also improve the color, but at a significant increase in cost.

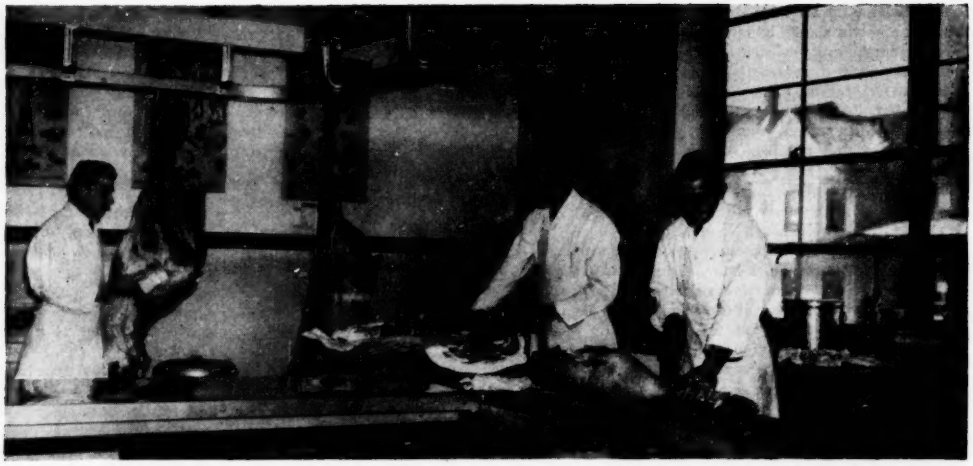
In general, water can be expressed more cheaply than it can be evaporated. Consideration was therefore given to expressing sufficient water from the ground potatoes, after treating them with sulphur dioxide, to prevent sticking in the drier without recycling. It was found that the critical moisture content of the material going to the drier was about 56 percent, instead of 43 percent, the moisture content of unpressed potatoes.

However, it is not economically feasible to reach 56 percent moisture in continuous-type rotary presses. Batch-type cider presses capable of developing a pressure of 200 psi. must be used, and the labor costs for this are high. Moreover, about 15 percent or more of the potato solids are lost, including valuable proteins, starch and sugar. Disposal of the press effluents may also constitute a stream-pollution problem. Thus, although the color of flour from pressed ground potatoes (which have not been recycled during drying) is slightly superior to that of the unpressed, recycled product, the additional cost of pressing is not justified. It is estimated that pressing instead of recycling would cost about $2 more per ton of product.

Gaging the Operation

In computing costs, the following assumptions are made: Both feed and flour plants would operate 170 days yearly, and each would process daily 75 tons of potatoes, which contain 21.2 percent solids and 78.8 percent moisture. Based on a 2-percent loss of potatoes during processing, the feed plant would produce daily 17.31 tons of product having 10 percent moisture. Based on 5-percent loss of potatoes during processing, the flour factory would produce daily 16.60 tons of product having 9 percent moisture.

It is further assumed that no one would go into the production of potato flour or feed without already possessing some of the facilities. The estimates, therefore, are based on the assumption of an established milling business.



INCOME-UPPING EXTRAS at Susquehanna plant, Sunbury, Pa., include retailing of beef and pork (seen here being cut for frozen packs) and the processing of meats brought to the plant by locker patrons and other customers.

Lockers Need Extra Services—Rents Not Enough

Accommodations ranging from processing raw materials, particularly meats, to retailing frozen foods are required to bolster earnings

ROBERT COCHRAN
"Food Industries," Cleveland

To boost narrowing profits and lure customers, many of the country's 10,617 food locker plant operators are finding it expeditious to extend services to include selling frozen foods, processing meat, selling home freezers and packaging materials, and delivery service.

The truth is that locker rentals alone will no longer give the operators the healthy margins that are essential to business. In fact, in the average co-op plant in the North Central states (13 percent are co-op), less than half the plant income is derived from rentals.

For example, in Ohio the average rental for the standard 6 cu. ft. locker is $16 per year. (Rentals vary with the type of locker, the door-type renting for about $2 less per year than the drawer type, which is more easily accessible.) If the locker plant is average size for Ohio, it has 760 lockers, and rentals will bring in $12,000.

Only other income will be from processing charges and retail sales. But expenses are high. Labor charges account for half the costs, utilities amount to 10 percent, and the remaining 40 percent is split among such charges as licenses, taxes, repairs, depreciation—and the profits, which are understandably small.

The locker industry, which in 1938 comprised a total of only 1,269 plants, has boomed all over the country, although the North Central states still account for 25 percent of all locker plants. Iowa leads the states with 841 plants, and a total capacity of 392,000 lockers. It is estimated that there are about 6,000,000 lockers in the country.

A recent survey in Columbus, Ohio —an area with a heavy concentration of locker plants—revealed the extent to which services are being offered by locker operators large and small.

Many customers complain about having to go into the zero temperature of the locker rooms. Installation of a push button system in the Harrison Market & Locker, in Columbus, has erased these complaints. To operate the system, the locker patron dials the number of her locker, pushes a button to start a roller chain conveyor, and waits for the bank of lockers in which her locker is located to swing around to the door of the locker room.

Comfort and Convenience

With this automatic system, the patron can select from her locker in complete comfort. Display cases of frozen foods, located near the lockers, offer an added advantage. The patron can look over the supplies in her locker with an eye to replenishing them directly from the display cases.

Salem Engineering Co. of Salem, Ohio, which specializes in freezing equipment for lockers, has also installed a system for freezing processed dough at Albrecht Bakery in Akron, Ohio, and another installation for freezing concentrated orange juice in the Juice Industries plant, Dunedin, Fla.

The Columbus survey indicated that the competitive situation there is becoming stronger. Local operators report that a few of their lockers are now empty, and patrons of the plants state that they have been urged by the operators to take additional space, or buy larger quantities of meat for processing.

This situation does not exist in the Cleveland area, where locker plants are few and waiting lists are still long.

However, locker plant operators everywhere are looking for new methods and services to widen their profit margins. They are also alarmed by the tapering off in demand for locker space, which has been traced to reduction of interest on the part of city and town dwellers.

Locker plant patrons are of three types: (1) Farm dwellers, who produce most of their food; (2) city dwellers, who produce some fruit and vegetables, and (3) city dwellers, who buy all their food. There has been no noticeable slackening of interest in

lockers among farmers. Less interest on the part of city dwellers may be traced to high meat prices, popularity of home freezers, and the fact that many of these people rented lockers only to carry through the wartime meat shortage.

One Columbus plant offers services that are typical of the new trends in locker plant operation. This plant, with a capacity of almost 1,800 lockers, processes meat for locker renters as well as owners of home freezers, sells a complete line of frozen foods plus dairy products and a few delicatessen items, sells packaging materials for home freezing, has an agency for home freezers, and retails meat processed and packaged at the plant. With all of these operations, the owner figures on a 20 percent profit on his initial investment (not amazing, since his plant was built in 1940 at lower capitalization).

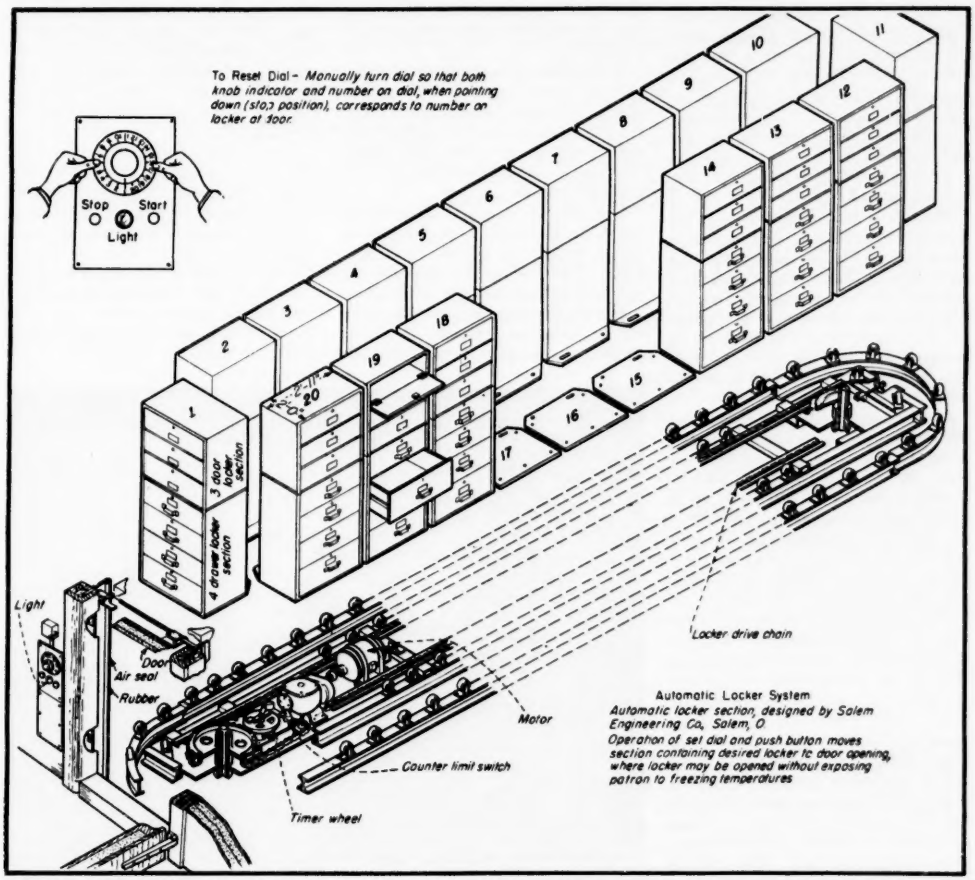
Certain services, such as the home freezer agency, are not lucrative, but the owner is convinced that he must continue the operation in order to keep his business growing. One reason for retaining the agency is the estimate that 1,000,000 home freezers will be in operation by 1949, compared with 400,000 at the end of 1947.

Many locker operators feel that they must keep up with home freezers for the opportunities the units offer them in additional locker rentals. The approach is this: The locker operator agrees that home freezers are convenient and efficient, but he claims they cannot replace the locker for bulk storage of meats and a wide variety of frozen foods. He therefore tries to sell the prospect on purchasing the small 6 cu. ft. size, and retaining his locker for bulk storage. Housewives, however, may not be impressed if the home unit will eliminate the need for frequent trips to the locker plant.

One locker plant operator offers a year's free rental of a locker with his sale of each home freezer. Thus he can advertise 12 cu. ft. of locker space for the price of one small-size home freezer. And he hopes the customer will see the advantages of retaining his locker when the free year is up.

Meat processing has become a standard feature of locker plants. It is estimated that 90 percent of locker plants in the North Central area either slaughter and process or buy carcasses and process the meat. Only 10 percent of the plants in the area offer no services other than sharp freezing.

Poor processing, a common complaint from patrons, is a headache that the locker operator must suffer. Poor processing may start when the animal is killed, or is improperly bled at the packing house. Operators are alert to see that the carcasses they buy from packers are in good condition. The carcasses purchased by the patron and brought to the locker plant for process-


To Reset Dial – Manually turn dial so that both knob indicator and number on dial, when pointing down (stop position), corresponds to number on locker at door.
Stop
Start
Light
3 door locker section
4 drawer locker section
Light
Door
Air seal
Rubber
Motor
Counter limit switch
Timer wheel
Locker drive chain
Automatic Locker System
Automatic locker section, designed by Salem Engineering Co, Salem, O.
Operation of set dial and push button moves section containing desired locker to door opening, where locker may be opened without exposing patron to freezing temperatures

SPACE is saved and customer readily accommodated in locker plant blueprinted here. Same engineering firm has installed a freezer system for dough in an Ohio bakery and one for orange juice in a Florida plant.

ing cause endless trouble for the operators. Most operators warn patrons against buying any meat from farmers, for often the carcass turns out to be skin and bones, or is a hind instead of fore quarter.

In recent years, with meat high and scarce, locker operators have been processing a number of deer and other animals for customers. Fish and fowl are also processed by many operators. However, this usually involves the purchase of special equipment.

One locker plant, run in conjunction with a grocery and meat market, sells its patrons meat by the cut in addition to the regular sides and quarters. The situation has worked out well for this operator, since he can sell the less desirable cuts in the retail store, or grind them up for hamburger.

"Use Our Easy Payment Plan"

Some locker patrons object to buying as much as a side or quarter of beef on the grounds that they are unable to pay such a large amount out of the household food budget at one time. One enterprising operator is working with a local finance company to arrange a loan system for this situation. Main difficulty is in finding an interest rate that is adequate to support the plan, yet low enough to make it profitable for the customer to use this buying aid.

The frozen food display case is becoming indispensible in the progressive locker plant. The plants surveyed sold Birds Eye or Honor brands, and filled out the line with "bastard brands." The operators are cautious about trying new brands on the public, and generally test the new foods at their own tables before offering them for sale.

Distributors charge low prices on the little-known brands to move them, and the operators follow the same technic. Even on the best-known brands, 10 percent discounts are offered if six or twelve packages are purchased. With the variety of frozen foods ranging from peas to pastry, the locker plant operator cannot overlook the importance of this aspect of his business.

Complete stocks of packaging materials for foods processed at home are another adjunct of the locker business. None of the plants surveyed provided facilities for preparation of frozen foods. One plant had tried it, but found that it involved too many problems. Scheduling the processing was almost impossible, and the extra effort required of the locker employees interfered with their regular duties. However, all of the plants quick-freeze produce already prepared. The average charge for this is 3c. a pound.

The popularity of home freezers has created an active market for packaging materials, and most operators find this service is worth the effort. Packaging materials are a sore point with locker operators. Many plants are using aluminum foil for their own packaging, but complain about the price and the fact that the material is not really efficient for their purpose.

Delivery service is performed by a few locker plants, although none of the plants surveyed offered this service except in conjunction with a regular grocery delivery. Unless a truck is already in operation, most locker operators find the expense of equipping and maintaining a delivery truck to be more than profit margins can take.

Merchandising methods used in the industry are varied and erratic. Interviews with several operators disclosed the following methods:

1. Check of locker contents, followed by telephone calls to patrons urging them to replenish their stocks. This is generally a haphazard operation, since plant operators have neither the time nor qualified personnel for such a program.

2. Classified advertising in shopping and community papers. This is usually a hit-or-miss proposition. Operators interviewed did not follow any definite schedule of advertising, though they claimed that the ads they had run produced results.

3. Radio advertising. Five locker plants in Columbus have banded together to sponsor a local radio program. The commercial plugs the advantages of patronizing a locker plant.

4. One operator proposes to work out a program whereby appliance dealers who sell home freezers will turn over lists of home freezer purchasers. The locker operator will then contact these home freezer owners and offer them a discount on frozen foods. Also, he will try to sell them on the idea of renting a locker as an auxiliary unit. Other operators are trying to get the cooperation of appliance dealers in recommending a locker plant to home freezer purchasers as a good source of meat supply.

The problems involved in operating a locker plant are many, according to the owners. Not the least of these problems is the question of expansion. Since investments for the newest type equipment may run as high as $100 per locker (not including building costs), most operators feel that they cannot afford to expand.

Pros vs. Cons

Operators believe they have strong selling points. They argue that: (1) Frozen foods are usually more palatable than canned foods, (2) locker plant freezing eliminates home canning work, (3) use of out-of-season foods improves family diets, (4) savings result from buying meat and foods from the locker, and (5) it is usually possible to get better cuts of meat of higher quality than in meat stores.

Critics of the industry counter with these disadvantages: (1) frequent trips to the locker are necessary unless a home freezer is used, (2) meat may not be as carefully inspected or processed as that sold in retail stores, and (3) it is often less convenient to go to the locker plant than it is to run into the nearest market, where a wide variety of foods, and often frozen foods, are available.

REQUIRING more space, but also convenient for renter, this system lifts the locker to the floor above the freezing room.

We Think . . .

■ Time is Ripe for Another Type of Processor—The Prepackager

While the case for and against prepackaging is argued back and forth, prepackaging continues on its more or less haphazard, though rapid, growth.

Practically everything else the housewife buys in the grocery store is packaged, weight-marked and price-tagged. Only "fresh" produce can she pinch, smell, poke, snap, shake, strip or otherwise personally test before buying—and she does.

Therein lies one of the big reasons for the prepackaging trend. With no mishandling possible, produce has a longer display life. It is protected from dust and human hands. Eye appeal carries through to the last package, its brand still proudly proclaimed. Both consumer and retailer save time otherwise spent in weighing, pricing and wrapping, and sales volume frequently is increased.

Against these advantages is the farmer's flat statement that prepackaging is an added financial burden he cannot assume. Neither is the consumer willing to pay more for fancy packs. The best size and type of container for each particular item has not yet been determined. Some present containers are not sufficiently durable—bags break, seams fail, windows break, and adhesives deteriorate.

But improvements are at hand. Better packaging materials and procedures are now available, and antiseptic cooling of fresh fruits and vegetables with chlorinated water will extend their fresh life.

Prepackaging does not necessarily add to the ultimate cost of "fresh" produce. A local prepackaging plant can lower costs by eliminating one or more middlemen and by cutting the retailer's waste and labor costs. Then the retailer can afford to absorb the costs of prepackaging instead of passing them on to the consumer. And he enjoys increased sales as a bonus.

The time is ripe for the prepackager to take his place in the food field as a new type of food processor. This is borne out by the growth of prepacking in large retail stores and in local warehouses serving such stores. But for the present, prepackaging plants must be near the retailers they serve. And prepackaged products must be of high, uniform quality and be reasonably priced.

The problems of shipping prepackaged fresh vegetables long distances have not yet been solved. Too much quality deterioration is encountered. But local prepackaging has been done successfully for years by chain store-operated plants. And it is more logical for one well-equipped prepackaging plant to do the job for several stores, than for each of these stores to prepackage on a small scale with inefficient facilities.

To meet the modern self-service store's needs, the prepackager should handle fresh meat cuts and fresh fish and poultry, as well as fruits and vegetables. Prepackaged meat sales are increasing rapidly—so fast, in fact, that packers are tempted to supply them.

But as of now, the field for the prepacker is wide open!

■ New Insecticides Important Factor in Estimating Crop Yields

A new factor in crop forecasting is the spate of new agricultural insecticides. This factor must not be omitted from calculations by those in management who, by the very nature of their jobs, must make decisions that are based on expectations of crop yields.

One of the more spectacular results from the use of a new insecticide occurred a few years ago when the Department of Agriculture miscalculated the potato crop. The unexpected factor was DDT, then in its first year of widespread commercial application. The use of this insecticide resulted in a 10-percent increase in farm production of potatoes above the computed national forecast—much to the discomfiture of the crop support program.

Toxaphene adds still another imponderable, for this insecticide is said to be effective against cotton boll weevils, cotton boll worms and cotton aphids. While cotton itself is not edible, the oil from cottonseed is very much in the food line. And if the cotton yield per acre increases notably as a result of widespread use of Toxaphene, the domestic vegetable oil supply will probably increase correspondingly. Cottonseed cake will also increase and indirectly affect cattle feed prices.

In 1948, 30,000,000 lb. of this insecticide was produced by about 30 manufacturers. The current year's production schedule calls for 70,000,000 lb. Whatever effect is traceable to the insecticide will thus be about double last year's. As a rule, it is safe to predict that such pest controls always will be in the direction of greater crop productivity. But the quantitative measure is still to be determined.

If the recent rapid progress in insecticides continues, it is conceivable that there may be developed some which will lower processing costs. One which would stop the corn ear worm, for example, would reduce labor and trimming losses. Something to hope for, anyway.

■ Food Technologist Needed on Agricultural Research Committee

All food industry executives will be delighted to support Dr. Charles Glen King as the new member of the eleven-man Agricultural Research Policy Committee, which is the advisory agency assisting the Secretary of Agriculture and the Research & Marketing Administration of that Department. No better representative of nutrition and nutrition research could have been chosen. We believe that Dr. King will contribute substantially to the program.

Dr. King was selected to succeed Dr. Frank B. Jewett, who recently resigned, and Dr. Kettering of General Motors fame, who was the previous and first industrial member of the Committee. We are sure that Dr. King will be able to do more than either of those two distinguished predecessors, because each of them found it impractical regularly to participate in the advisory work at Washington. But his appointment, which we commend strongly, leaves the Board without a member representing food technology. All of the other members represent farm organ-

izations, state agencies, and other nonindustrial or nontechnical phases of research.

A great deal of good is being done by application of the funds provided under the Research & Marketing Act. Certain very important gaps in technical knowledge are being closed by the new researches so supported. But we note with regret that the fundamentals—food processing and food technology, the essential servants of agriculture—are not as well represented as they should be. There is no member of the eleven-man committee prepared by experience and professional activity to speak on this phase of research and marketing.

It has been suggested to Secretary Brannan that the membership on this committee be rotated so that each year there would be a few new faces around the conference table to bring fresh impressions and new recommendations to the Department. That is certainly a desirable change which we hope the Secretary will adopt. And he should apply the new policy by naming two or three members to the committee from fields of activity that represent true technical research. Progress by mere economic inquiry is important. Enlargement of present research and marketing studies of the Department is certainly worthwhile. But the long-time good of agriculture and of the American people cannot be achieved without also having more aggressive application of technology.

We believe that Congress intended these funds to be largely applied in the field of technologic activity. Only by that means can we hope for early development of means for handling agricultural surpluses.

▪ F&DA Warnings Make DDT "Taboo" for Milk Producers

DDT must not be used with milk cattle, in milk barns, or otherwise where it may give trace contamination of milk. This is the essence of a warning from the Department of Agriculture to dairy farmers. It is occasioned by warnings from the Food & Drug Administration as to the toxicity of this chemical and the danger to milk users, especially small children and infants.

As a result of this broad warning, it is to be expected that the use of DDT anywhere from the cow pastures to the kitchen, including all intermediate milk handling establishments, may soon be a questionable practice or a thing of the past.

We do not pretend to know how much real hazard and how much of mere precaution underlies the warning. One suspects that there may be just a little bit of the alarmist element. But it is unlikely that there was any intentional alarmist effort of an ulterior sort.

Whatever the motivating forces, one clear consequence is to be expected. This is the real need for development of less toxic but equally or more effective alternate insecticides. One or two of these are being suggested. They will be thoroughly investigated in Washington. Producers and large industrial users should busy themselves also.

The dairy industry must not leave even a minute trace of suspicion in the public mind that milk is not safe. We do not think that DDT has actually ever made it unsafe. But so long as there is any ground for suspicion, it is important that corrective measures be taken and wholly safe substitutes be found and used.

Lest we leave readers with the impression that DDT is especially hazardous—or in the event you have received that impression from other sources—let us quote what the Federal Security Agency recently said in defense of it:

"There is no evidence that the use of DDT in accordance with the recommendations of the various Federal agencies has ever caused human sickness due to the DDT itself. This is despite that fact that thousands of tons have been used annually for the past four or five years in the home and for crop and animal protection. However, minor toxic symptoms may be produced by kerosene and various solvents used in DDT and practically all other insecticidal mixtures.

"Statements that DDT is responsible for causing so-called 'virus X disease' of man and 'X disease' of cattle are totally without foundation.

"There is no justification for public alarm as to the safety of the milk supply from the standpoint of DDT contamination."

This seems to bear out the point that the Department of Agriculture is merely being cautious.

▪ History Has a Purpose, and We Give You Highlights on the Big Four

What with the high cost of supporting a business in these times, the Big Four meat packers didn't fare as well in 1948 as they did in 1947. And like most businesses under today's conditions, they cannot be certain as to where they are going. But they do know where they have been. Which brings up a few interesting historical highlights.

Swift & Co.—which does better than a $2 billion annual business and is one of the country's largest companies—grew from a firm founded by Gustavus Swift. While still in his 'teens, he peddled meat in a red wagon on Cape Cod, transferring his activities to Chicago in 1875. There "Gus," as he was known in the industry, led a campaign to ship meat east in railroad refrigerator cars. It so happened that the railroads made more money by carrying livestock. Besides, Easterners objected to Western dressed beef. But the dressed meat could be sold at a lower price to consumers. So finally Swift's idea was accepted, paving the way for the development of the tremendous Midwest meat industry.

P. D. Armour also went to Chicago in 1875, after searching for gold in California and working in the Milwaukee plant of John Plankinton. As is well-known, Mr. Armour found his gold in Chicago. That he founded Armour Mission and the Armour Institute may not be so well known.

Wilson & Co.'s history goes back to 1853, when Sulzberger & Sons Co. was founded. This firm was reorganized in 1916. Thomas Wilson was brought in from Morris & Co., and the company name was changed to Wilson.

In the middle of the 19th century, a Mr. Cudahy came to Milwaukee from Collan, County Kilkenny. He brought four sons. And one named Michael went to work for John Plankinton and later became a partner of Armour in Chicago. Then these two packing pioneers established Armour-Cudahy Packing Co. of Omaha, taking a plant operated by Sir Thomas Lipton of tea and yacht fame. Armour afterward bought out Cudahy in Chicago and sold out to him in Omaha.

Michael gave the packing industry a boost by developing summer curing of meats under refrigeration.

And John Plankinton deserves a little credit for training two of the founders of the Big Four, as well as building quite a nice business himself.

What is accomplished by reciting history such as this? Well, for one thing young men in industry should realize that a great company can grow from the initiative of one man. And bigger things remain to be achieved.

This is Why the Nash is the Most Simple Compressor

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

- **No internal wearing parts.**
- **No valves, pistons, or vanes.**
- **No internal lubrication.**
- **Low maintenance cost.**
- **Saves floor space.**
- **Desired delivery temperature automatically maintained.**
- **Slugs of liquid entering pump will do no harm.**
- **75 pounds in a single stage.**

NASH ENGINEERING COMPANY
31 WILSON, SO. NORWALK, CONN.

Convention Reports

OFFICERS of AACS talk over the past and future: From left: W. L. Haley, Fisher Flouring Mills Co., Seattle, retiring president; Frank R. Schwain, Procter & Gamble, re-elected secretary; Frank C. Holland, General Mills, Inc., president; and J. A. Schellenberger, Kansas State College, president-elect.

Cereal Chemists Talk Shop

Recent developments in wheat milling technology, in commercial production of bread and other bakery products, and in the field of nutrition and cereal enrichment, were reported and discussed at the 34th Annual Meeting of the American Association of Cereal Chemists in New York City, May 16 to 20. There were more than 600 registrants—over 100 more than attended last year's meeting.

The 49 technical papers and committee reports were presented during the four days at seven symposium sessions on:

1. Milling technology. 2. Laboratory methods and instruments. 3. Enzymes. 4. Grain quality and drying practice. 5. Chemistry and technology of flour and doughs. 6. Shortenings and emulsifiers. 7. Nutrition and enrichment.

Greatest interest was shown in the session on shortenings and emulsifiers. Also exceptionally well attended were those on chemistry and technology of flour and doughs and milling technology.

J. P. Kass, Atlas Powder Co., Wilmington, Del., opened the shortening and emulsifiers session with a description of the theoretical role of surface-active agents in affecting the shortening characteristics of fats added to doughs and batters by altering the energy relationships at emulsion interfaces.

Properties of the non-ionic agents, condensation products of fatty acids containing hydrophobic groups and polyhydric alcohols or polyoxyethylene containing hydrophilic groups, were reported to depend upon the size and shape of the hydrophilic groups. Mr. Kass said that these agents modify the staling characteristics of starch pastes and doughs by affecting the behavior of starch sols.

George T. Carlin, Swift & Co., Chicago, presented data and slides to show that monoglyceride shortenings inhibit staling of bread if the Katz X-ray diffraction is an accepted measurement of the development of staling. Results of studies showed that the X-ray diffraction patterns closely parallel staling predictions based on penetrometer studies.

Study Firmness

Oscar Skovholt, Quality Bakers of America, New York City, commented that degree of softness is not a measure of freshness. By means of the Baker Compressimeter, studies were made on rate of firmness development in bread during different seasons of the year and in bread containing no emulsifier, 0.5 percent vegetable oil monoglyceride, and 0.5 percent polyoxyethylene stearate. Temperature variations during the seasons were reported to influence the rate of firmness development, whereas both emulsifiers retarded the rate, with polyoxyethylene stearate having the greater effect.

L. B. Crossland, R. T. Vanderbilt Co., Inc., East Norwalk, Conn., outlined a tentative standard compression test for staling studies. His recommendations were based on results from studies on the influence of age of bread, plunger shape used with Baker Compressimeter, and dimension of test pieces on the stress-strain relations of bread crumb.

He discounted effects of variations in thickness of test pieces. Breads 12 to 72 hours old gave the best test results.

E. C. Edelmann, Great Atlantic & Pacific Tea Co., New York City, reported the effect of ingredient variations on softness of bread crumb with and without the addition of emulsifiers. The ingredients studied were lard, sucrose, dry milk solids, yeast, salt, glyceryl monostearate and polyoxyethylene stearate.

Lard was found to retard crumb firmness, with 3 percent giving the best results. Variations in yeast and salt had little effect, although elimination of salt made the crumb less firm and gave 12 percent greater loaf volume than when 3 percent was used. No effect was noted when 4 to 12 percent sucrose was used. The use of emulsifiers increased the firmness as the sucrose content increased.

B. G. Carson, C. J. Patterson Co., Kansas City, Mo., said that crumbliness of bread crumb is not a good test of relative staling rates unless all ingredients are identical. He reported on different methods for determining the staling rates of breads containing no polyoxyethylene monostearate and those containing 0.5 percent.

Compressibility measurements made on bread from 5 to 115 hours old indicated retardation of staling when an emulsifier was used. This action was explained on the basis of reduction of the hydrophilic character of starch and increase in the absorption properties of the flour used.

George T. Carlin, Swift & Co., Chicago, reviewed attempts to show the structure of bread crumb as evidence of the mechanics by which monoglyceride shortening influences bread tenderness and keeping quality. The shortenings affect the diameter and length of gluten strands in both the dough and bread, the gelation or swelling properties of the starch during baking, and the quantity of water soluble starch in the bread. This evidence was determined by microscopic and histologic technics.

Aging Agents

Adoption by the American flour millers of scientific findings in the nutritional field during the past years, as shown in the quick changeover from nitrogen trichloride (Agene) to chlorine dioxide for the aging of flour was told by Max Milner, Kansas State College, Manhattan, Kan., as an introduction to his report on studies of a num-

ber of physical factors influencing the efficiency of nitrogen trichloride in flour bleaching.

He outlined a simple test for efficiency of commercial bleaching units in terms of results obtained with the laboratory bleaching unit.

At the chemistry and technology of flour and dough session, papers were given on application of the Chapman and McFarlane test, the glucose-protein interaction in dough, the preparation of wheat flour pentosans for reconstituted dough, the determination of ammonium persulphate in flour and dough and the effect of heat treating milk on the sulfhydryl groups of milk serum proteins. Also discussed were the characteristics of sodium diacetate as an inhibitor of mold and "rope" bacteria, the effect of free fatty acids in frying fats upon the fat absorption and symmetry of cake doughnuts, the present status of canned bread with respect to pick-up of can enamel flavor, reduction in density and freedom from botulism and "rope", and the electronic determination of dough physical characteristics while mixing in commercial mixers.

Income, Outgo Study

At the business session, publication of another edition of *Cereal Laboratory Methods* by the Committee on Methods of Analysis was approved by the membership. A finance committee was appointed by the newly installed president, Frank C. Hildebrand of General Mills Inc., Minneapolis, to study the Association's income and outgo as basis for future action in respect to increasing membership dues and employing a full-time editorial staff to handle Association publications.

It was announced that the 1950 Annual Meeting will be held at the Sheraton Hotel, Chicago, during the week of May 15. R. J. Sumner, Anheuser-Busch Inc., St. Louis, is acting chairman of the program committee for the meeting, and D. B. Pratt, B. A. Eckhart Milling Co., Chicago, is chairman of the local arrangements committee.

J. A. Schellenberger, Kansas State College, was elected president-elect; Frank R. Schwain, Procter & Gamble Co., Ivorydale, Ohio, was re-elected secretary, and George T. Carlin was re-elected treasurer.

Associates Get Underway

After two years of figuring out "where do we go from here", the food processors and packaging manufacturers, who organized the Associates of the Food & Container Institute, came away from their second annual meeting, in Norfolk, in May, feeling that they are on the road toward results.

The basis for this feeling grew out of the discussion of current food research problems by staff members of the Institute. But more importantly, it came from a booklet—*Food and Container Problems of the Armed Forces*—published by the Associates and distributed at the meeting.

This 37-page publication described 84 specific military research problems in the following fields: Animal products; cereal and baked goods; dairy, and oils and fats; fruit and vegetables; miscellaneous products; flexible packaging; and rigid containers.

Typical of the problem statements is this one taken from the 13 presented in the processed meat field:

Dehydrated Meats

"*Problem:* Development of palatable dehydrated precooked meat products with storage life of at least 6 months at 100 deg. F.

"*Present Situation:* Dehydrated corned beef hash and dehydrated meat and rice deteriorate within 3 to 4 months at 100 deg. F. They develop fishy and metallic flavors, the meat turns black, and hard particles remain after the reconstitution period of 10 min. A dehydrated meat bar has been developed, but its acceptability in the field after storage is as yet unknown. Dehydrated steaks, chops, hamburgers, and other varieties of meat products which will retain flavor, color, and texture comparable to fresh meats prepared in the same manner, are required."

The method of coordinating food and packaging industry work on these projects with that of the Institute has already been worked out. The activities committee of the Associates has been split up into Advisory Project subcommittees for each of the food and packaging fields. The chairman of the subcommittee works with his opposite number on the Institute staff.

Model for Others

One project subcommittee — the dairy products group—has already submitted a report on the research situation in its field which is being distributed as a model to other Associate members.

Reaction of those present seemed to be that with the presentation of the research problems in writing, and with the organization of industry-Institute subcommittees to work in the various food and packaging fields, the group had at last established not only its reason for being, but the materials and procedures necessary for fruitful action.

Talks given by Institute officials emphasized that, from the military viewpoint, many of the specifications for the various types of rations are not considered adequate at the present time. Most of the rations of World War II have been changed in specification, and the problem now is to develop more satisfactory rations for conditions similar to those of World War II—plus new rations for conditions that may be different from those of World War II.

For instance, considerable emphasis was placed on the development of foods and packages that would be satisfactory under wider ranges of temperature for use, if they should be needed, in Arctic warfare. These specifications require a product and its container to stand up under temperature ranges of minus 20 deg. F. or lower, to plus 100 deg. F. or higher.

The military representation at the meeting was cited as indicative of the degree of unification already achieved in food procurement in the Armed Forces. Among those who addressed the meeting were Rear Adm. E. D. Foster, chief of the Navy's Bureau of Supplies & Accounts; and Gen. William H. Middleswart, chief of the military planning division of the Office of Quartermaster General.

Working Teams

Subcommittee chairmen, with their Institute branch counterparts, are as follows:

Animal Products

Dr. C. E. Gross, John Morrell & Co. Berram W. Gardner, Jr., Animal Products.

Cereal & Baked Products

Dr. F. N. Peters, Quaker Oats Co. Theodore Soloski, Cereal & Baked Products.

Fruits and Vegetables

John T. Knowles, Libby, McNeill & Libby. Dr. Joseph R. Wagner, Fruits & Vegetables.

Dairy Products

Robert Remaley, Kraft Foods Co. Carl A. Vorhees, Dairy, Oil & Fat Products.

General Products

Dr. W. R. Johnston, Standard Brands, Inc. Wilbur L. duBois, General Products.

Flexible Containers

Lee Croy, Marathon Corp. Frank J. Rubinate, Subsistence.

Rigid Containers

Earl Graham, Crown Can Co. Robert A. Rinschler, Packing & Coating.

NCA Looks at Competition

Current business conditions affecting the candy industry, production problems and merchandising trends topped the discussion at the 66th annual convention of the National Confectioners Association, June 5 to 9, in Chicago.

Philip P. Gott, president of the Association, warned members that the industry has returned to a competitive economy and that although the national income is at a high level and there are few governmental restrictions, it is now a buyer's market and manufacturers must produce an even higher quality of confectionery at the lowest possible cost.

At a well-attended production forum, Lawrence F. Martin, head of the agricultural chemical research div., USDA, New Orleans, reported on a 5-year cooperative research program of the NCA and the Bureau of Agricultural & Industrial Chemistry. The purpose of the research is to increase the utilization of farm products in the confectionery industry to the mutual advantage of farmers and candy manufacturers.

Experiments have been made with 30 different new ingredients. Protein of soybeans in the form of soya flour was tested, and it was found that with a pure white concentrated preparation containing 90 percent soya protein, any type of candy can be made, including pulled hard candies of good flavor and texture.

Solvent extraction for obtaining peanut oil has been stimulated by the demand for nut protein for industrial uses. This will eventually lead to the production of high quality peanut protein for food products, according to Dr. Martin. He showed samples of recent candy research which included a white nougat made with 5 percent brewer's dry yeast; a chocolate dipped marshmallow with 10 percent dry nonfat milk solids; a vanilla caramel containing 20 percent demineralized dry milk whey; and a mint-flavored hard candy containing 2 percent precipitated calcium carbonate. The new ingredients not only add to the food value of the candies but also improve taste and texture.

Dust hazards in the industry were described by C. O. Dickens, vice-president, E. J. Brach & Sons, Chicago. He described the dust explosion and resultant fire last September at the Brach plant and showed slides of the damage. Dust hazards are a problem in all candy plants, since starch dust is explosive regardless of whether it is oil-treated, heat-treated or high in moisture content. Mr. Dicken outlined 13 operating rules for dust hazards control, in which are included prevention of dust clouds, elimination of sources of ignition and, in case both happen simultaneously, provision of adequate vents for relief of pressure.

Norman W. Kempf, manager of research, Walter Baker Chocolate & Cocoa Div., General Foods Corp., Dorchester, Mass., emphasized need for standardization of method for determining viscosity of chocolate coatings. He said that one of the first official acts of the newly formed American Association of Candy Technologists was to appoint a committee to obtain standardized methods of testing viscosity of chocolate. The committee made a survey to determine methods currently used by manufacturers and found that most used the MacMichael viscosimeter. The members did not advise universal adoption of this method, since a wide variety of conditions are involved and results are not satisfactory. They recommended that research work be continued to find a method that will truly indicate the covering power of the coatings. A MacMichael method for use under specified conditions has been recommended for study for one year on a tentative basis.

Production technics were described by James A. King, Nulomoline Co., New York City. He said that the demands for lower prices and lowered production costs are a challenge to production men and that they should consider use of improved new production machinery and adoption of latest materials handling methods and equipment.

A symposium was held on the current trends in selling, advertising and merchandising. Henry H. Howlett, president, Container Laboratories, Inc., New York City, said that both television and the accelerated trends toward self-service merchandising make eye appeal of package important. He stated that a recent survey by duPont showed that 8 out of 10 candy purchases are not planned and urged the candy industry not to be too hidebound by tradition. He warned against over-packaging, which is unnecessary for protection of contents and will adversely affect the prospective purchasers.

As acting chairman of a panel discussion on personnel relations, Robert B. Schnering, vice-president, Curtis Candy Co., Chicago, said that employees need more than the satisfaction of their economic need to keep them happy. He added that management that is conscious of each employees' psychological needs, as a human being, experiences all the advantages of its employees' full loyalty and cooperation.

Trends in employer-employee relations were discussed by E. R. Bartley, personnel director, Bunte Bros., Chicago. He said that workers in the candy industry are well organized throughout the country with the exception of Chicago. Surveys made by the NCA show that there are five AFL, five CIO, and several independent unions having contracts with candy manufacturers. His expectation is that labor is more interested in "fringe issues" at present than in any wage increases as attainments in the "fourth round" of bargaining. He identified "fringe issues" to be: Group life and sickness insurance, hospitalization insurance, pensions, pay for holiday shutdowns, vacations with pay, and rest and lunch periods with pay. These benefits are likely to cost the companies more than would an increase in pay of as much as 10.5c. per hour.

S. B. Willard, personnel director, Nutrine Candy Co., Chicago, reported on a survey of the cost of "fringe benefits" over the nation in various companies and industries. The survey covered 168 firms and the costs ranged from 14.64c. per hour to 20 percent of the payroll. He made a plea for sincerity on the part of management in dealing with employees and he cited 14 points—qualities of management leadership submitted last December to a meeting of Chicago Association of Commerce by Jack Staehle, Aldens Inc.—which should characterize a well-rounded human relations program between management and employees.

Held concurrently with the convention was the 23rd confectionery industries exposition comprising over 100 exhibits of equipment, materials, and supplies and services for confectionery manufacturers and merchandisers.

NCA Officers for 1949-1950

Re-Elected:

President, Philip P. Gott, Chicago.

Vice President, Irvin C. Shaffer, Just Born, Inc., New York City.

Secretary - Treasurer, Arthur L. Stang, Shotwell Mfg. Co., Chicago.

Newly Elected:

Vice President, Neal V. Diller, Nutrine Candy Co., Chicago.

U. S. Candy Industry Representatives to International Cocoa Conference, in London, England Aug. 30 and Sept. 1, Philip P. Gott and Harry R. Chapman, New England Confectionery Co., Cambridge, Mass.

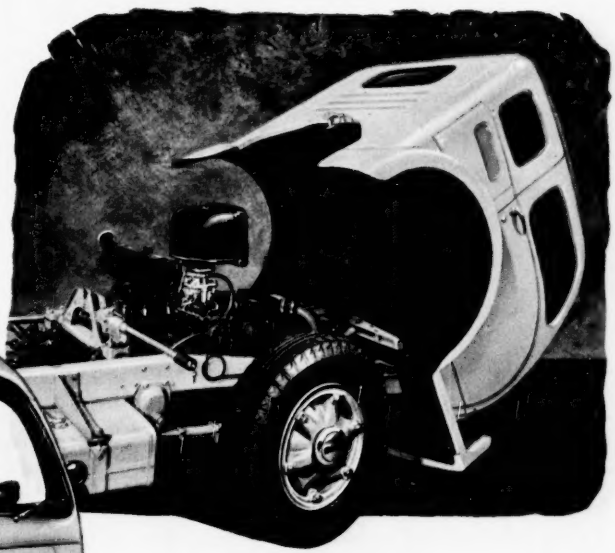
PERFECT FRONT-END ACCESSIBILITY

. . . for both driver and mechanic

THE DRIVER saves time and energy . . . thanks to curb-level step, wide doors, low cab floor with no obstructions to interfere with getting in and out either side, quickly and easily.

●

THE MECHANIC saves time, is able to do better work . . . thanks to complete accessibility of mechanical parts at "bench-height". Power-lift cab provides this in less than 30 seconds at the turn of a key.



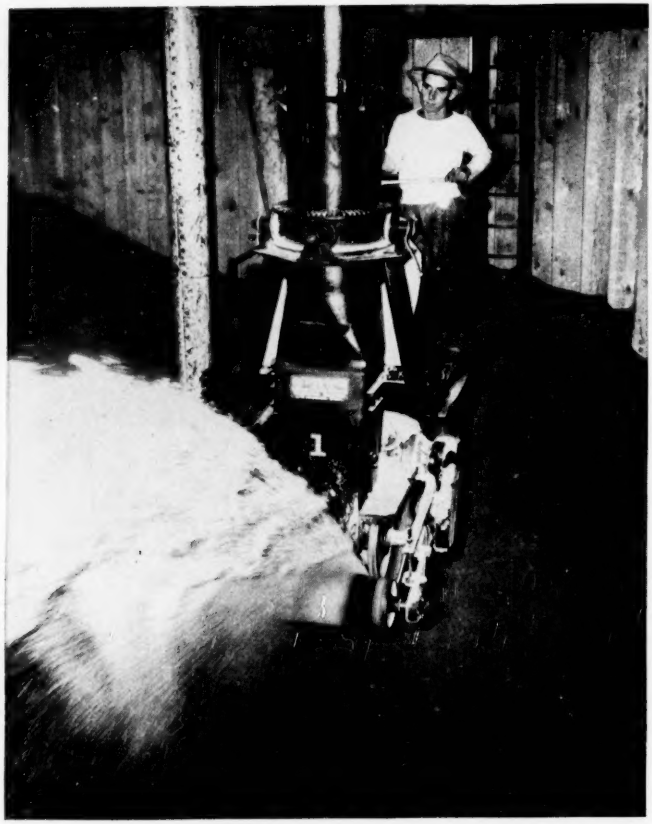
THIS ENTIRELY NEW KIND OF TRUCK is a modern machine tool of transportation . . . engineered to do more work in less time. It saves time . . . "getting there" in present-day traffic, parking and unloading. It saves driver energy . . . helps to make him a better driver. It saves servicing and inspection time . . . permits the maintenance man to do better work because of "bench-height" accessibility to the engine and all front-end mechanical parts. Ask your local White Representative for all the time- and cost-saving facts as they apply to your business.

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio, U. S. A.
THE WHITE MOTOR COMPANY OF CANADA LIMITED
Factory at Montreal

White
SUPER POWER
3000

FOR 50 YEARS THE GREATEST NAME IN TRUCKS

"Pass the Sugar"



MEANS FILLING AND EMPTYING A 36,000-TON "BOWL"

At this plant in Hawaii "Pass the Sugar" means moving raw sugar by several stages from receiving hopper, through storage, to ship's hold... and there distributing it to insure maximum use of shipping space. A complicated materials handling job!—but one that a specially designed S-A conveying system does efficiently and at low cost.

Designing and engineering bulk food materials handling systems for moving large volume at lowest cost has been a job of S-A engineers for nearly 50 years. Their knowledge of the food industries requirements for systems to meet all needs is both broad and deep . . . and it is yours for the asking.

Whether you plan to install a new conveyor unit or want an entirely new bulk materials handling system, you *should* get the recommendations of S-A engineers. Write today.

SUGAR INDUSTRY
OF MAUI, KAHULUI,
MAUI, T. H.

Nine belt conveyors and a pan feeder handle bulk sugar at this plant. Sugar from plantations is moved from a receiving hopper via pan feeder and belt conveyor to a 36,000 ton capacity storage bin. Four belt conveyors reclaim and move sugar through scale house to traveling gantries on loading dock. Boom conveyors and spouts place sugar in ships' holds. The centrifugal thrower unit shown above, is used in the large storage bin and on the spouts in the ship's hold to fill bin and holds to capacity.

STEPHEN S-A ADAMSON MFG. CO.

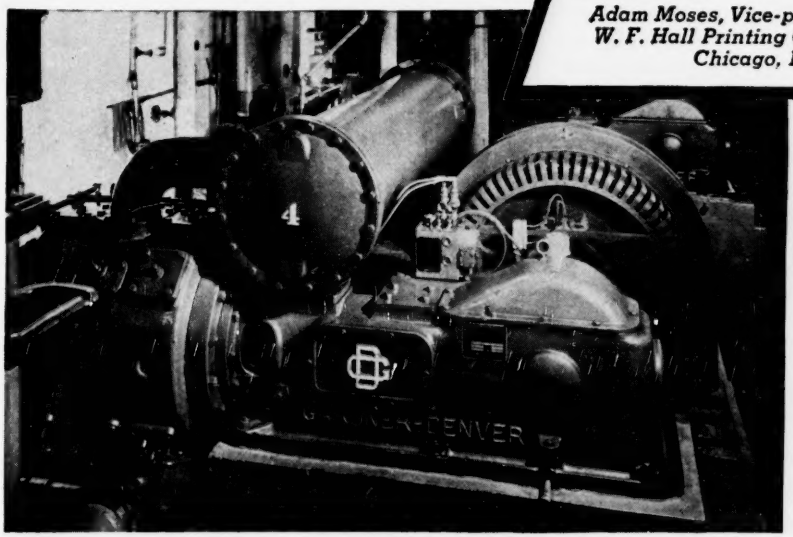
6 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif. • Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

NO STOPS... NO REPAIRS...
In more than two years!

"For the past two years our Gardner-Denver compressor has operated under approximately 100% load for 24 hours a day, seven days a week ... overall performance has been exceptionally satisfactory."

Adam Moses, Vice-pres.
W. F. Hall Printing Co.
Chicago, Ill.



A Gardner-Denver HAB 13½ & 8 x 8 two-stage, horizontal compressor in the W. F. Hall Printing Co. plant, Chicago.

Continuous operation! Yet this Gardner-Denver Class "HA" Horizontal Compressor has required *no repairs other than minor adjustments* in more than two years. Accurate flow meter equipment indicates no variation in compressor output. Volumetric efficiency remains high . . . horsepower requirements low. Here are some "HA" features that explain this uninterrupted service record:

For complete information, write
Gardner-Denver Company, Quincy, Illinois

★ *AIR CYLINDERS* oiled by force-feed lubricator with separate and adjustable feed to each cylinder. Large and unrestricted valve and port areas result in low velocities and minimum friction losses.

★ *TIMKEN ROLLER MAIN BEARINGS* eliminate shaft friction and wear—provide permanent rigidity with freedom from bearing vibration, pounding and side thrust.

★ *LARGE WATER JACKET* areas for cooler running . . . lower discharge temperatures and lubricating economy.

★ *HEAVY-DUTY SIDE CRANK* type main frame of massive design—heavily ribbed and reinforced to give maximum strength and rigidity.

★ *DUO-PLATE CUSHIONED VALVES* for high delivery capacity.

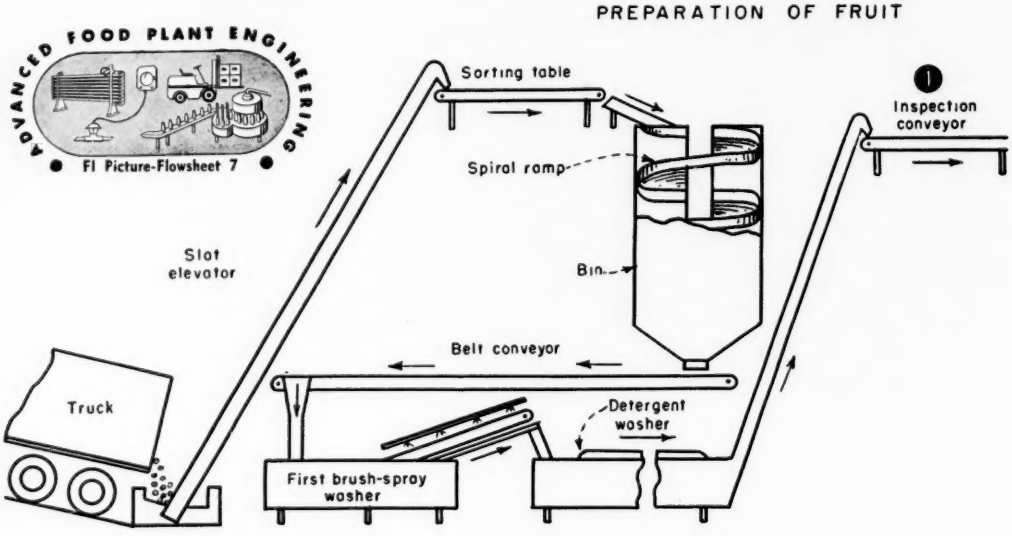
GARDNER-DENVER *Since 1859*

1 **BELT** where fruit receives final inspection before starting through the process.

Frozen Concentrated Citrus Juice

Winner of the 1949 FI Award, this process involves a revolutionary type of evaporator

(Article on Page 67)



THIS PROCESS won the 1949 FOOD INDUSTRIES Award. Advanced throughout, it is highlighted by a revolutionary low-temperature evaporator of unusual efficiency.

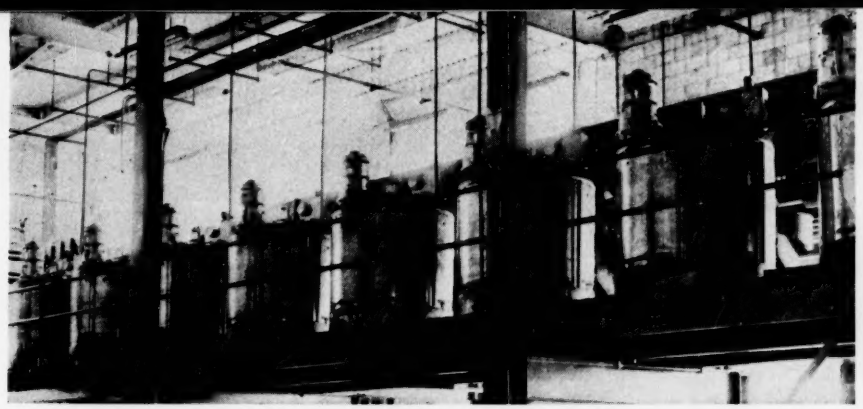
Brought to the plant by truck, premium fruit is elevated to inspection belts. Good fruit goes to storage bins with spiral-ramp baffles that prevent bruising, then through a brush-and-spray washer and a "sterilizing" tank containing a detergent solution. Elevated to the juice rooms, the fruit receives a final inspection. Then it again is washed by sprays and brushes, the water containing 5 ppm. free chlorine to give a substantially sterile outer surface.

After being machine-sorted for size, the fruit goes to extractors. Eight handle oranges of average size, and two are for grapefruit and over- and under-size oranges. The juice flows through stainless steel troughs to finishers. One with a 0.027-in. screen handles 80 percent of the juice. Another with a 1/8-in. screen takes 20 percent. Juice from the latter finisher, containing pulp and juice sacs, is pumped to a skimming tank for removal of coarse sacs. Then the temperature of this juice is lowered to 34 deg. F. in cold-wall tanks and held as cut-back juice for the concentrate.

Pulp-free juice from the first finisher is pumped to a balance tank and then to a vacuum deaerator. Ammonia-jacketed tubes continuously cool the deaerated juice to 40 deg., and the juice flows to balance tanks supplying the five vacuum evaporators. These evaporators are continuous, single-effect, 3-stage, falling-film type. Evaporation takes but 5 min., at 60 deg. Latent heat is supplied by condensing hot ammonia gas from refrigeration compressors, and these compressors also supply the cooling for the water-vapor condensers.

Concentrated to 58 percent solids, the juice is pumped to cold-wall tanks and adjusted with pulpy single-strength cut-back juice to 41.5–42.5 percent solids for orange juice and 38.5–39.5 percent for grapefruit juice. The temperature is lowered to 26 deg. during blending.

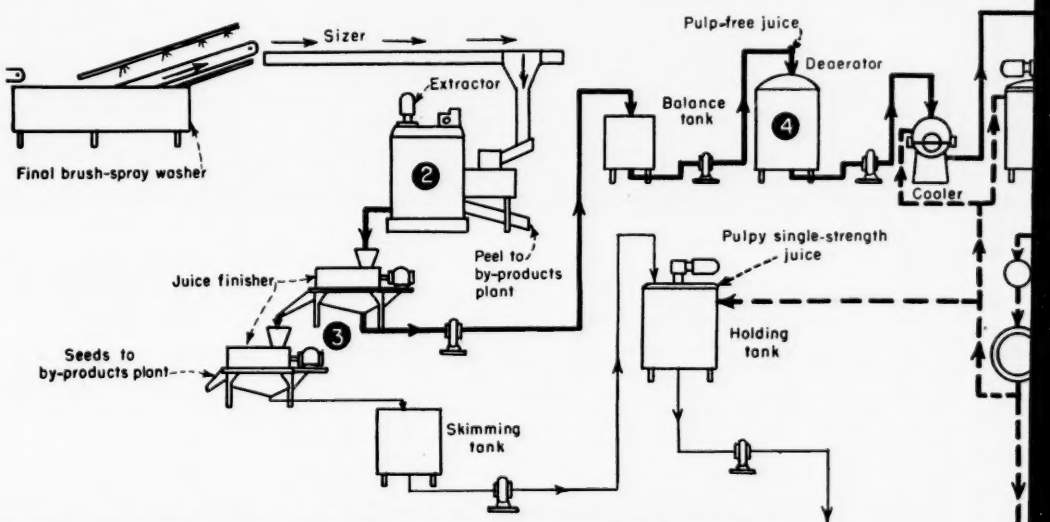
Blended juice is pumped to cold-wall balancing tanks supplying Votators, which slush-freeze the juice to 17 deg. for vacuum filling into cans. An airblast tunnel (−30 deg.) reduces the temperature at the center of 6-oz. cans to 0 deg. in 1 hr.; for 32-oz. cans, 2 hr. is required. The hard-frozen product is then cased and stored at −15 deg.



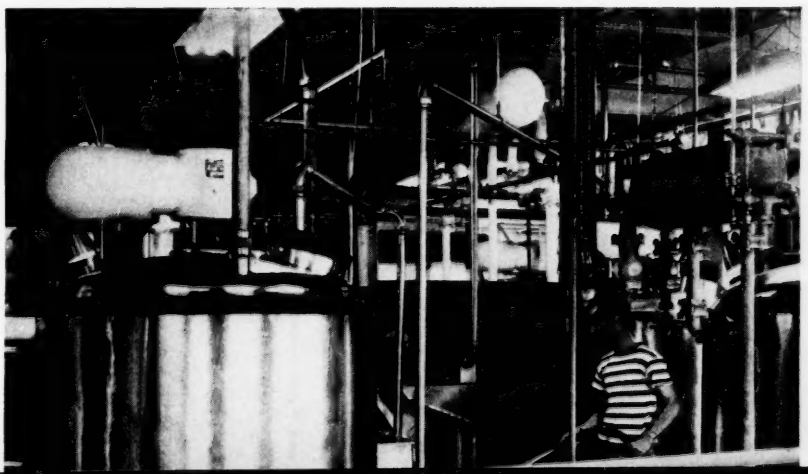
2 **BATTERY** of juice extractors. These machines insert tube into fruit to drain juice as fruit is squeezed. Bitter principles from peel are excluded.

3 **GRAPEFRUIT** into the finish

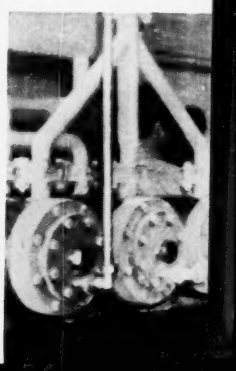
JUICE EXTRACTION AND TREATMENT

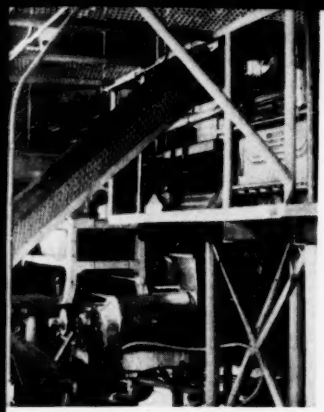


7 **COLD-WALL** tanks in which single-strength juice is blended with concentrate. Tanks lower juice temperature to 26 deg.

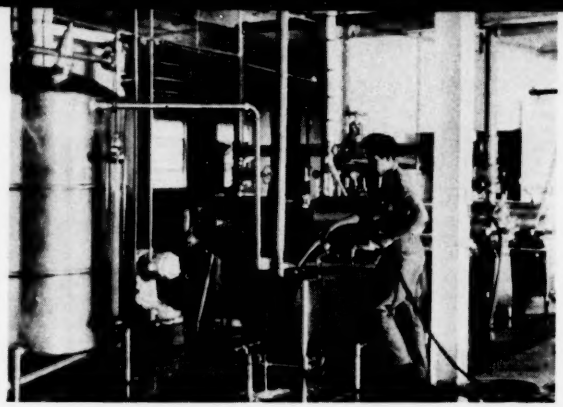


8 **VOTATORS** slush-free tory to its being filled

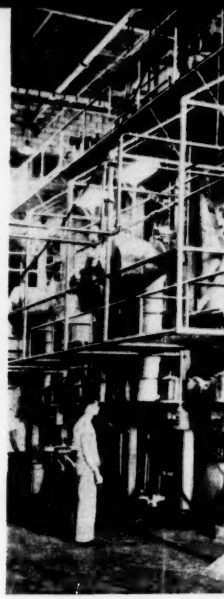




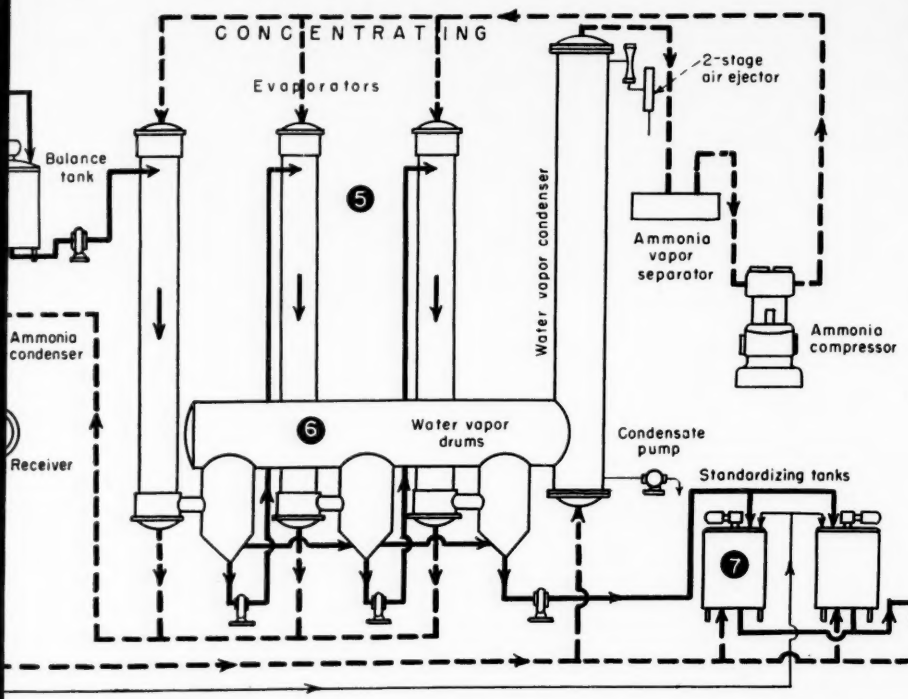
juice extractor (top right) discharges
r below.



4 **FALLING-FILM** vacuum deaerator (left) removes air. Juice goes to coolers (rear).



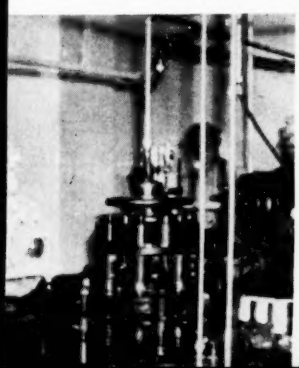
5 **VACUUM** evaporators. I
ity, one (right) 320 gal.

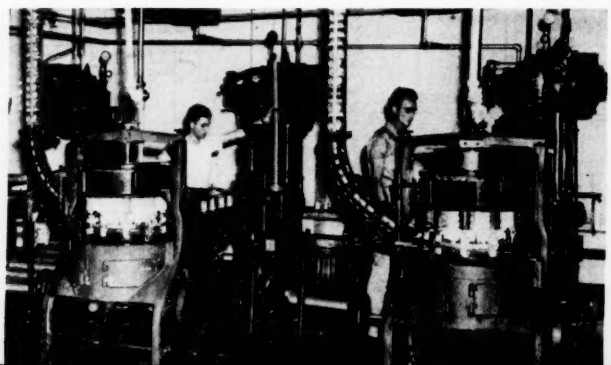


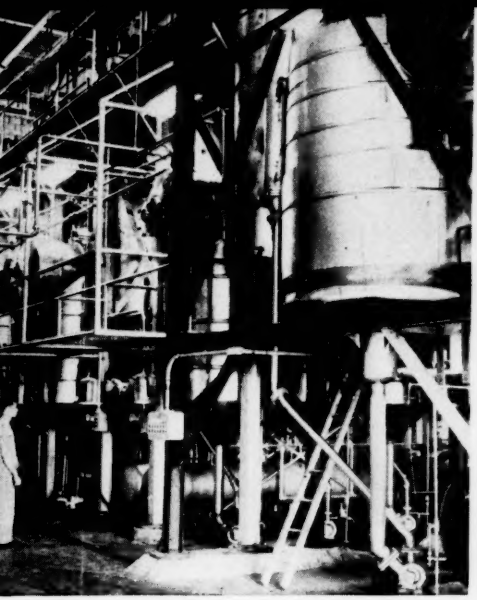
ze blended juice to 17 deg. prepara-
into cans.

9 **POSITIVE-DISPLACEMENT** machines fill 120 of the 6-oz. cans a minute. Closers apply lids.

10 **AIR-BLAST** tunne
The 6-oz. cans fre

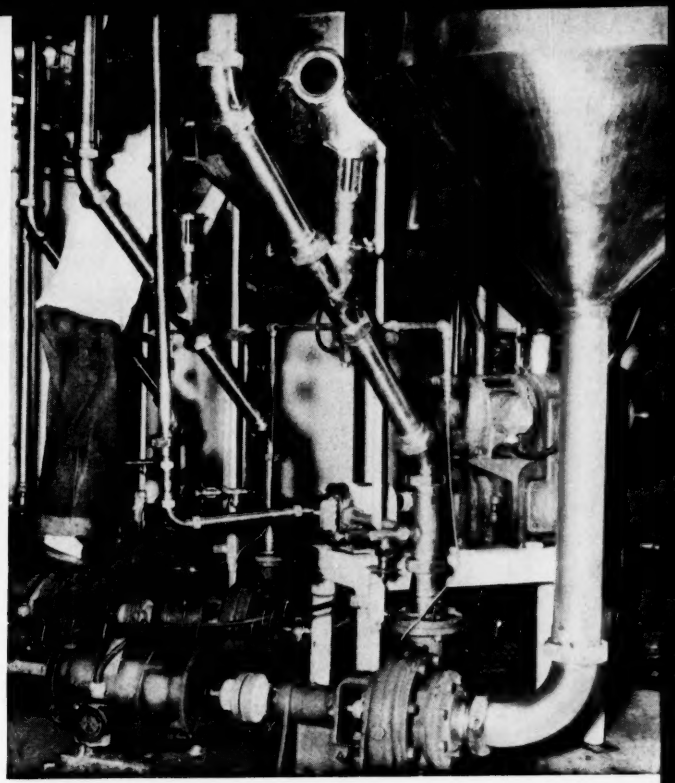




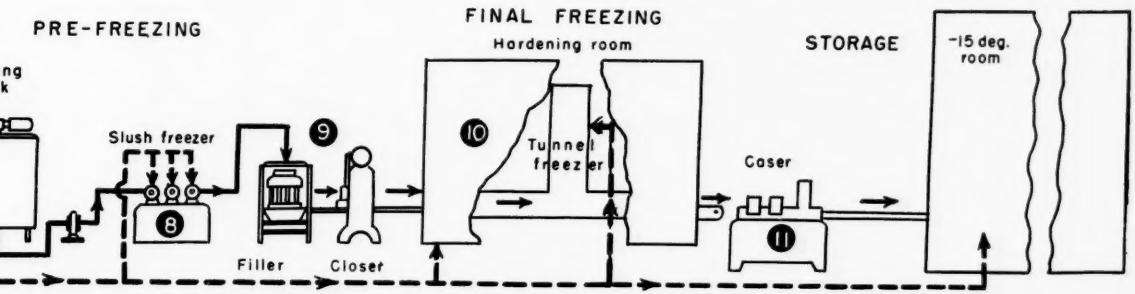


UM evaporators. Four of them have 130-gal.-per-hr. capac-
ie (right) 320 gal.

end
n juice flow
ndordizing juice
frigerant

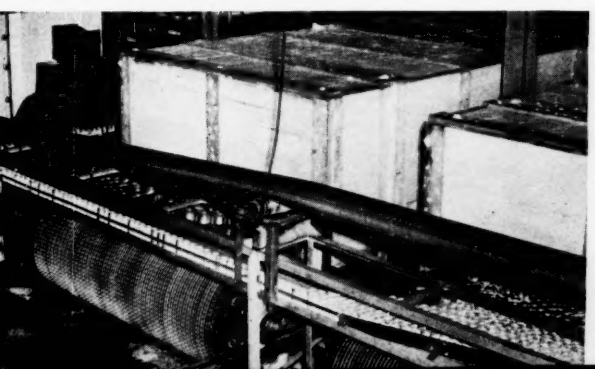


6 **VAPOR** flash-off units boost evaporator capacity. Pumps recirculate juice to top of evaporators.



AIR-BLAST tunnels, operating at —30 deg., hard-freeze juice in cans. The 6-oz. cans freeze in 1 hr.

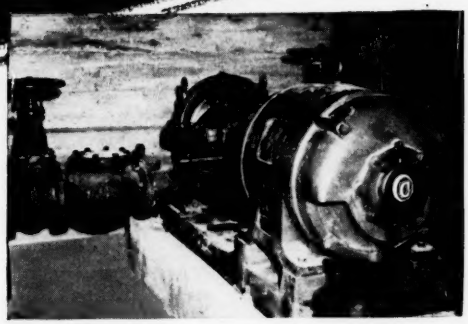
11 **MACHINES** form display cartons and put three cans into each, handling 400 cans a minute.



Select the Correct

Century MOTOR

For Your Liquid Pumping and Refrigeration Requirements



• 150 horsepower Century motor driving a water pump for a large central station.

Century's wide range of types, kinds and sizes assures motors that exactly meet the power requirements of your equipment.

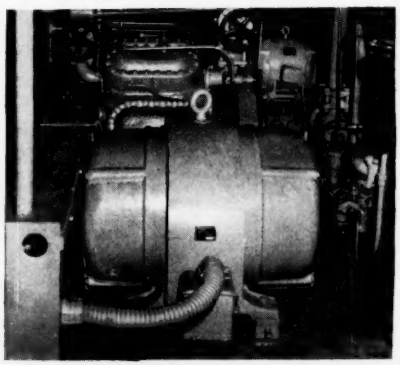
Whether the application is a centrifugal pump or an unloaded compressor, deep well pump or compressors started under full load—there is a motor available in single phase, polyphase or direct current.

Drip-proof, splashproof, totally enclosed fan cooled and explosion-proof frames are available to profect the vital parts of the motor against any kind of hazardous atmosphere.

UNSEEN because they are sealed-in—many thousands of integral and fractional H. P. Century Hermetic Motors have been successfully serving the Refrigeration Industry for fifteen years.

Century builds a complete line of electric motors in a wide range of types and kinds, in sizes from 1/6 to 400 horsepower.

Specify Century motors for all your electric power requirements.



• 50/25 horsepower Century splashproof motor driving a refrigeration compressor in a bottling plant.

Century C MOTORS

Popular types and ratings are generally available from factory and branch office stocks.

-610

CENTURY ELECTRIC CO[illegible]

Why buy piping the hard way When CRANE supplies everything?

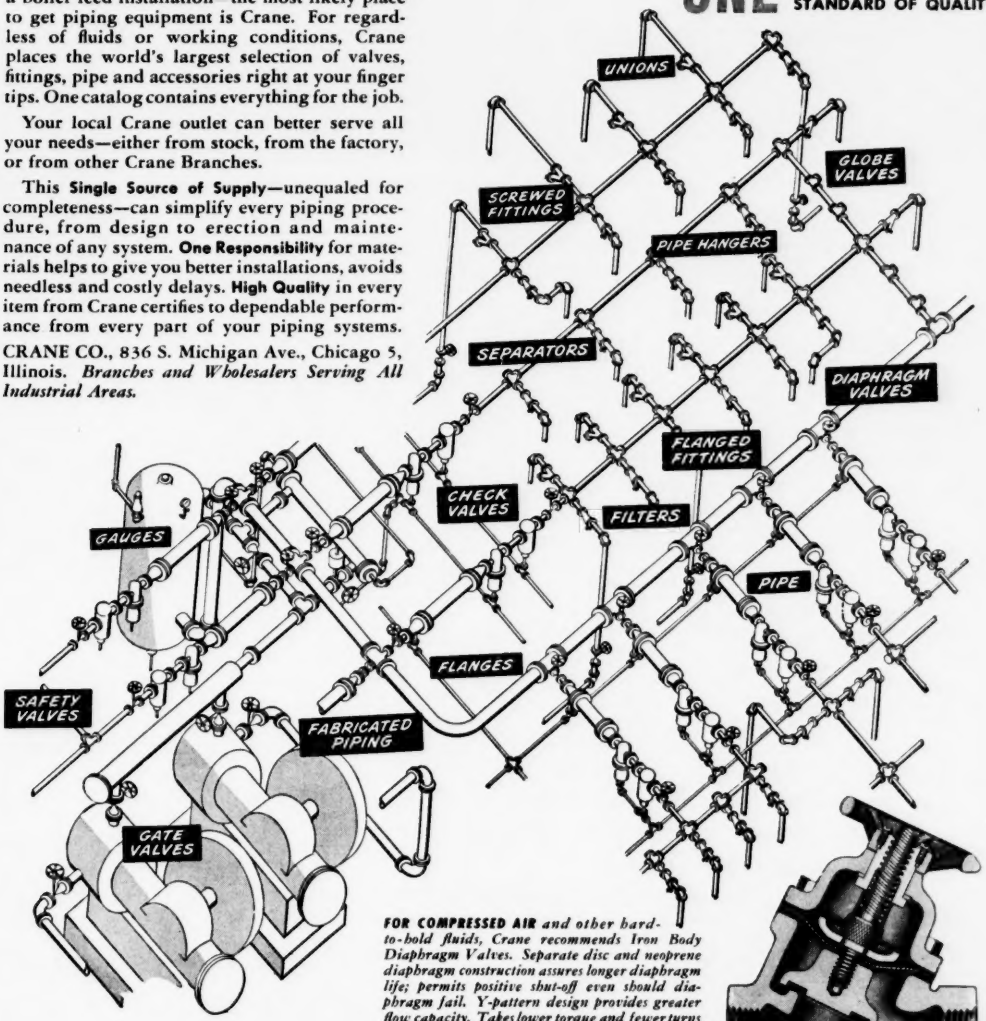
ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

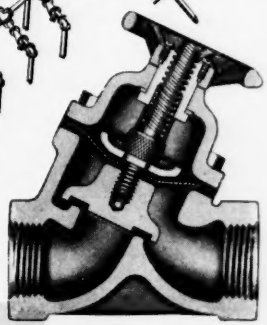
For Air Service Piping—as for a superheater or a boiler feed installation—the most likely place to get piping equipment is Crane. For regardless of fluids or working conditions, Crane places the world's largest selection of valves, fittings, pipe and accessories right at your finger tips. One catalog contains everything for the job.

Your local Crane outlet can better serve all your needs—either from stock, from the factory, or from other Crane Branches.

This **Single Source of Supply**—unequaled for completeness—can simplify every piping procedure, from design to erection and maintenance of any system. **One Responsibility** for materials helps to give you better installations, avoids needless and costly delays. **High Quality** in every item from Crane certifies to dependable performance from every part of your piping systems.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Illinois. *Branches and Wholesalers Serving All Industrial Areas.*





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VALVES • FITTINGS
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AND HEATING

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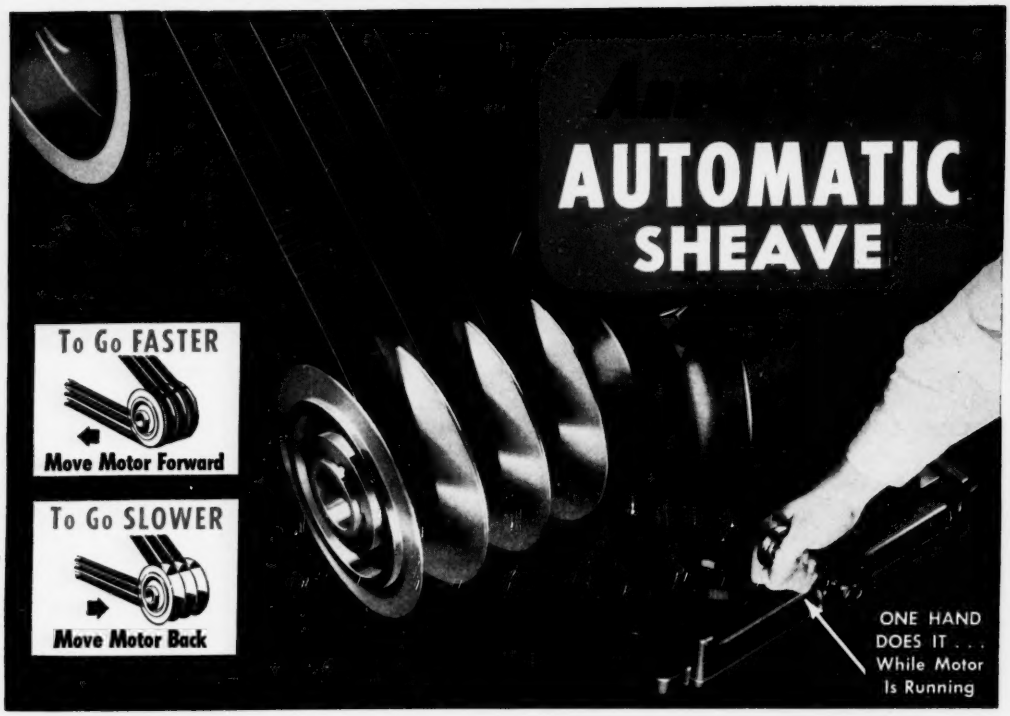
FOR EVERY PIPING SYSTEM



Varies Speed *WITHOUT STOPPING*

Another *Texrope* Engineering Triumph!

- Instant speed control at lower cost than ever before
- Covers most speed changing needs from 3 to 20 hp
- Extremely simple — one sheave does all
- Infinitely variable speed — 200% range

SIMPLEST, most economical method of instant speed control ever devised. Simply move motor forward to increase speed and move it back to decrease. The new *Vari-Pitch* Automatic Sheave changes pitch diameter and holds belts at proper tension automatically. All other parts of the drive are standard *Texrope* V-belt drive components.

For details see your A-C Authorized Dealer or Sales Office or write for bulletin 20B7223. *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks.

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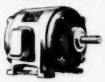


MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

ALLIS-CHALMERS, 1113A SO. 70 ST.
MILWAUKEE, WIS.

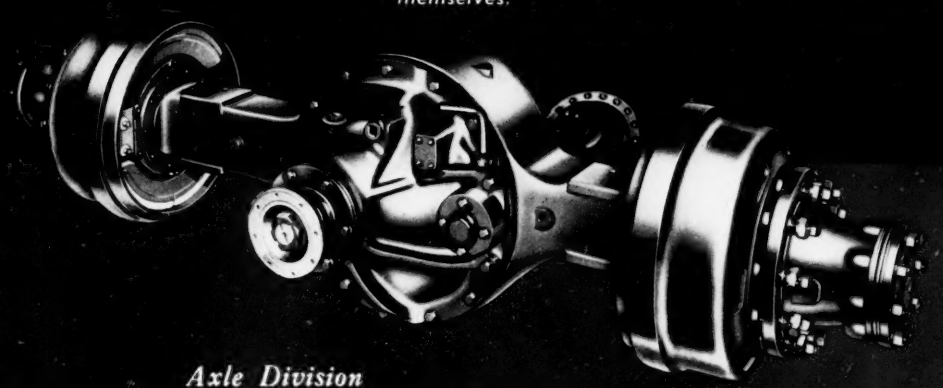
ALLIS-CHALMERS

Cut Down on Your Operating Costs—*Demand*

EATON AXLES

To cost-conscious truck operators, Eaton 2-Speed Axles mean faster trips, reduced vehicle operating and maintenance expenses. These advantages are possible because Eaton 2-Speed Axles double the conventional number of gear ratios, thus enabling drivers to use the RIGHT ratio for every operating condition—starting out under full load, climbing grades, high-balling, quick shifting in traffic. As a result, vital truck parts are not overstressed, engines are permitted to run at efficient speeds, cutting gas and oil consumption and minimizing engine wear. Long life for the axle is assured by rugged construction and exclusive Eaton features. Ask your truck dealer to prove that Eaton Axles *more than pay for themselves.*

More Than a Million Eaton 2-Speed Axles in Trucks Today



Axle Division

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

EATON

for a greater profit margin

PACKAGE FOOD the DELTASEAL way*

It costs less to fill bags the Deltaseal way because filling and closing is faster . . . mostly automatic. There's less handling . . . more bags closed per hour.

And Deltaseal bags are easy to open. Customers just *pull, cut and pour.* The handy spout channels the food right into the measuring cup or storage container.

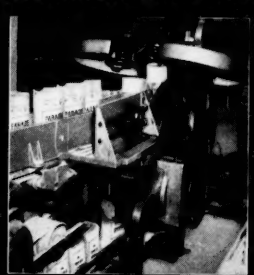
The Deltaseal closure gives a neat full-pack appearance and makes it easy to build attention-getting displays in stores. Your brand, printed in bright, sparkling colors adds still further to the sales-inviting appearance of the package.

Ask a Bemis representative about the economy of Deltaseal Bags and the Deltaseal Packaging System.

Bemis

"America's No. 1 Bag Maker"

*DELTASEAL BAGS plus the DELTASEAL PACKAGING SYSTEM



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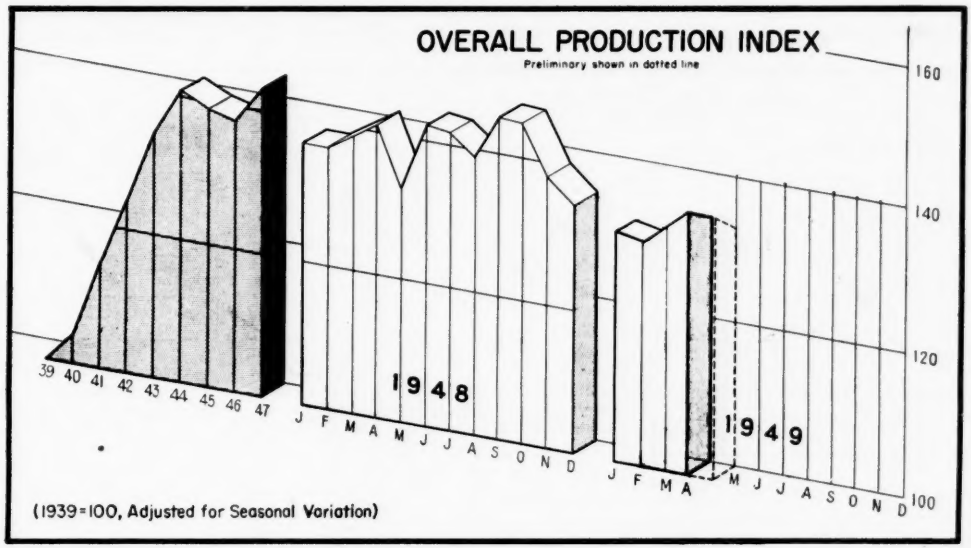
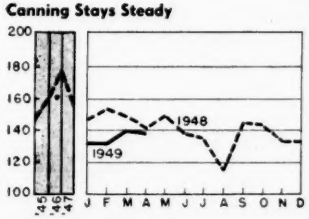
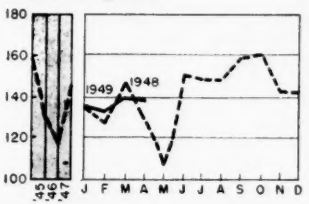
Food Industries Index


OVERALL PRODUCTION INDEX
Preliminary shown in dotted line
160
140
120
100
39 40 41 42 43 44 45 46 47
1948
J F M A M J J A S O N D
1949
J F M A M J J A S O N D
(1939=100, Adjusted for Seasonal Variation)

Canning Stays Steady



Meat Packing Holds



At a Glance—

(1939 = 100. With All Figures Adjusted for Seasonal Variations)

	Apr. 1949	Mar. 1949	Percent Change	Year Ago
Baking	137	134	+2	135
Beverages	152	151	+1	160
Butter	78	77	+1	65
Canning	139	140	−1	144
Cereals	137	141	−3	134
Condensed Milk	171	171	.	168
Confectionery	107	113	−5	118
Flour	122	120	+2	130
Ice Cream	169	162	+4	172
Malt Liquors	147	152	−3	166
Margarine	283	265	+7	304
Meat Packing	139	140	−1	122
Sugar, Beet	62	65	−5	89
Sugar, Cane	61	67	−9	74

Consumption Outlook for Coming Months Indicates Pickup in Food Production

April's final index figure settled at 134, with the preliminary estimate for May coming down another point to 133. Commodity production held fairly even throughout the March-April period.

THE RECORD of retail food sales thus far in 1949 gives promise that consumption of processed foods will be slightly higher this year than in 1948. For the first four months, dollar sales of retail food stores averaged about the same as last year, although prices averaged 2 percent lower. There was a rise in units sold.

The Department of Agriculture has estimated domestic consumption per capita will be near last year's figure. However, total consumption of processed foods is seen rising, as a result of their growing popularity and the climb in population.

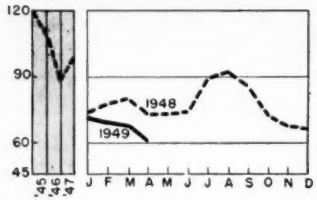
The heavy volume of food being sold at retail has not yet resulted in a corresponding rise in the index of manufacturers' output. This is because distributors have been working down their stocks, and export demand for some items has been lower. Manufacturers' stocks, particularly of canned goods, were also drawn down to supply part of the food moving into consumption during the first half of the year.

It is likely, however, that processed food production will go up more than seasonally during the remainder of 1949. Such a rise will be necessary to maintain the present rate of consumption, since distributors' stocks are now believed to be at minimum working levels—in some cases lower than really desirable. There is some evidence that the gradual liquidation of canned goods inventories, which has been proceeding for the past three years, is near an end. This has been one of the principal checks on overall food production. An increase is also expected in ECA purchases of meat and dairy products for export.

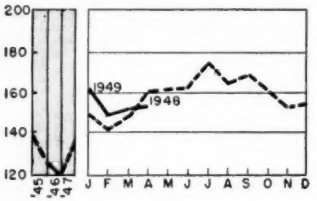
The strong outlook for production is reinforced by prospects of large farm marketings that will furnish an adequate supply of raw materials. In fact, many farm products are likely to be surplus. Processing of the new crops should carry FOOD INDUSTRIES' index close to last year's level.

Here is the outlook for production of various foods, based on crop forecasts of the Bureau of Agricultural Economics:

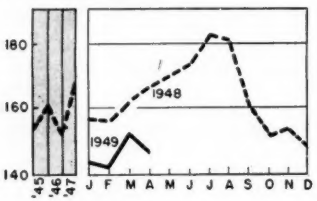
Cane Sugar Drops Some More



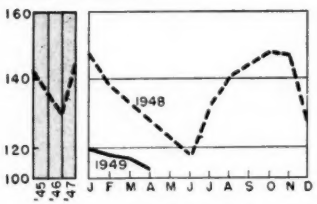
Beverages Keep Gain



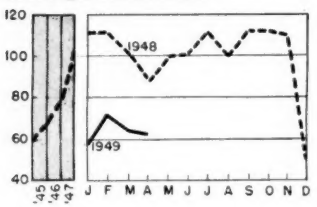
Malt Drinks Decline



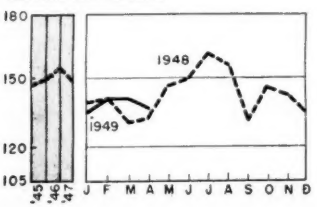
Candy Continues Down



Beet Sugar Continues Fall



Cereals Take a Slide



Meats: Total production through the rest of 1949 promises to exceed the output in the same months of 1948. The big increase will be in production of pork products, resulting from heavy marketing of hogs expected this fall. This will more than offset any drop in production of beef and lamb. Stocks of meat in cold storage warehouses are above average. So a considerable drop in prices is possible as the supply increases.

Dairy products: Milk output in the first four months of 1949 topped 1948 by 3.5 percent. The amount used in manufactured dairy products increased much more, 11 percent. And an even greater gain was made by butter, cheese and non-fat dry milk solids. Production of evaporated milk, dry whole milk, and ice cream is seen trending down.

More milk has resulted from higher output per cow, obtained by better feeding. Since feeding is now close to a maximum, the increase in milk production may level off in coming months. But the amount devoted to manufactured products may continue to increase. More milk is being sold by farmers as whole milk, with the non-fat portion, as well as cream, being used in manufacture. **Export demand for** non-fat dry milk solids is particularly strong. Inventories of dairy products, however, have risen above average, so that storage demand will be slacker. Prices hinge on the success of government price-support operations.

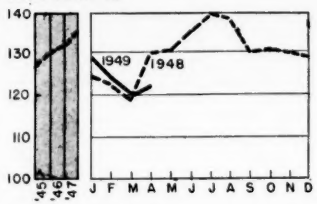
Canned goods: Sales to consumers have run ahead of replacement buying by distributors. So more orders for the canners are likely. These new orders will probably require as large a pack as 1948. Latest indications are that plantings of vegetables for processing will about equal those of last year, although plantings of corn and tomatoes, now heavily supplied, will be lower. A normal or better crop of deciduous fruits is expected. And heavy citrus crops are predicted.

Grain products: The huge winter wheat crop and the large carryover of corn assure an ample supply of these raw materials for millers. If the fall harvest of wheat and corn is as large as forecast, there will be more grain than can be used in food products, and more than can be stored. Accordingly, prices are likely to drop below government support levels.

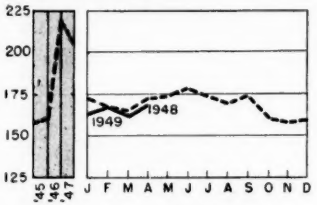
Other products: Production of vegetable oil products will be helped by the large carryover of oil-bearing crops, with further big plantings indicated. The supply of animal fats will also go up with heavier slaughter.

The supply of sugar for beverages and confectionery is still limited by import restrictions. But domestic sugar production may be heavier.

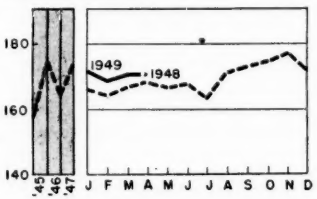
Flour Turns Up



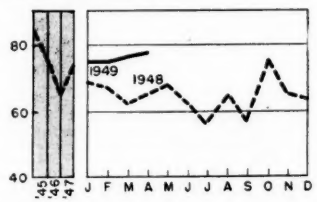
Ice Cream Starts Climb



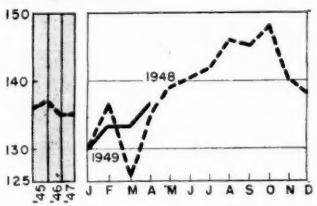
Condensed Milk Holds On



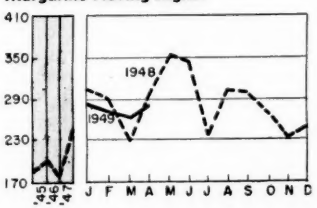
Butter Still Goes Up



Baking Shows Rise



Margarine Moving Higher



A significant development for VANILLA USERS

Alvanya

(imitation vanilla absolute)

is an important research product of the vanilla absolute type that duplicates the flavor of true vanilla beans, including the important aromatic qualities that are not contributed by vanillin.

ALVANYA alone will provide a vanilla flavor of unusually true fidelity.

ALVANYA's flavor strength is 40 times that of true vanilla.

ALVANYA will improve any vanilla flavor, true or imitation, and it is remarkably effective when added to the exhaustively extracted "pure" vanillas with which the market is currently flooded.

ALVANYA will provide an outstanding flavor when used to replace true vanilla in a vanilla-vanillin mixture and will contribute a vast flavor improvement when used to replace all or part of the vanillin constituent.

ALVANYA has superior stability under extreme temperatures, both low and high.

ALVANYA costs only $1.90 lb., in 25 lb. lots, or more.

It is important that you know about ALVANYA, send for your laboratory sample.

Alva FLAVORS

VAN AMERINGEN - HAEBLER, INC.
315 FOURTH AVENUE, NEW YORK 10

New Packages and Products

Handy Package for Processed Meats

Better point-of-sale display, more consumer convenience, and faster wrapping time are highlights of Wallet-Pack, a new meat package introduced by Marathon Corp., Menasha, Wis.

Made of high grade solid white paper board, duowaxed for extra protection, the single-unit pack requires no separate liners or wrappers. Various types of liners, attached to the package, furnish specific protection for different products.

Windows and either transparent or opaque greaseproof liners are optional characteristics of the package.

Folding action of the carton tends to line up the product in the center panel for better appearance and more solid pack. And the locking structure is positive.

The container is compact—handy size for home refrigerator as well as packer's trucks and storage rooms.

The maker states that meat packers also benefit from faster production with reduced labor costs. Labor studies have shown actual wrapping time to be about half of that required for multiple unit packages.

Condiments Offered In Small Liquid Portions

Liquid spices and herbs, under the tradename Sperb, are now being offered in small glass vials holding ⅛ fluid oz. The containers are displayed in an attractive bright colored cardboard holder designed for convenience in the kitchen.

Two different groups of flavorings are packaged. Rosemary, cinnamon, celery, clove, anise and nutmeg come in one. Mint, tarragon, allspice, thyme, garlic and marjoram are offered in the other.

The vials are about 3 in. long and are capped with an ivory-colored plastic.

Suggestions for use are contained in a descriptive pamphlet. In addition, the back of the holder lists some general directions.

Quickness of use is one of the advantages of these condiments. They need not be cooked with the food, but can be added shortly before serving.

Test-distribution all over the country is being conducted by the maker, Favorite Flavors Co., New York.

Plastic Coated Milk Cartons Make Debut

Vinylite resin coatings on the paper milk containers now used by Bowman Dairy Co., Chicago, permit changes in fabrication which result in a great saving in shipping space. The plastic film, produced by Bakelite Corp., N. Y., is tasteless, odorless and non-toxic.

Coating is applied on paper rolls from which the containers are die cut and shipped economically in flat form to dairies. At the milk plants, the flat blanks are fed into equipment especially designed by Oswego Falls Corp., Fulton, N. Y. These machines automatically sterilize, assemble and fill the cartons in a single operation.

All surfaces of the blanks which come in contact with dairy products are heat sterilized.

A new type of pouring spout is another feature of this development. A corner of the top has aluminum foil tabs upon which the filling date is printed. Lifting up the tabs folds back a section, affording a pouring edge.

Delevoped and produced by Sealright Co., Inc., Fulton, N. Y., the Sealking container is available in half-pints, one-third pints, pint, and quart sizes.

(Packages and Products Cont'd)

HOW A CAP CAN HELP SELL YOUR PRODUCT

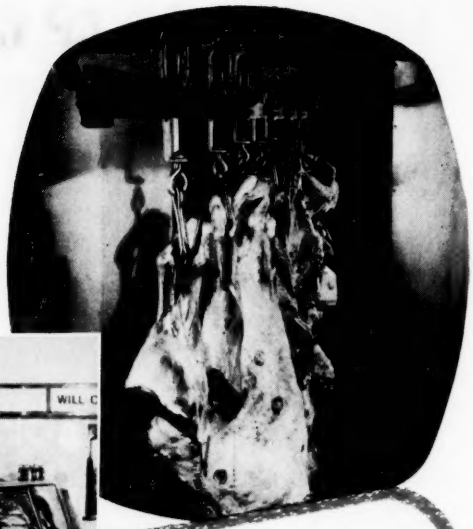
GOOD CAP DESIGN can make a difference in sales. For example, this "before and after" illustration shows how smart, colorful design can focus attention on the package, make a quick impression of the brand name, identify the product. If your sales are slipping, perhaps it would pay you to take another look at your metal caps. Armstrong's expert package designers may be able to make design suggestions which could improve your product sales. An attractive, crisp sales message can be added in color for just a fraction of a cent per cap. Our designers will be glad to show you ideas without obligation. For design suggestions, just send a sample package and market data to Armstrong Cork Co., Glass and Closure Div., 4207 Prince St., Lancaster, Pa.

Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

WEST COAST REPRESENTATIVE: I. F. SCHNIER CO., INC., SAN FRANCISCO 7 AND LOS ANGELES 12

From killing room ▸ ▾ to display counter



Nothing equals Stainless Steel

IN meat hooks and table tops, tubs and mixers, grinders and slicers, conveyors and trucks, Stainless Steel does so much more, does it so much better, and lasts so much longer that it is, in the last analysis, the most economical material to use.

Because equipment built of Stainless Steel is unusual in its ability to prevent contamination . . . because it offers superior protection to purity and flavor and stays like new regardless of age . . . leading packers famous for the high quality of their products swear by Stainless. Many use it 100% in all equipment that touches meat.

For almost 20 years we have been supplying U·S·S Stainless Steel to makers of packing plant equipment. In composition, finish and fabricating qualities, this service-tested, perfected Stainless allows wide latitude in design and permits the employment of advanced fabricating techniques. The result is equipment that delivers the utmost in performance.

Make it a point to specify "U·S·S Stainless Steel" in your next equipment order. It adds nothing to the cost—it can add many years of greater satisfaction.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO · CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH · TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

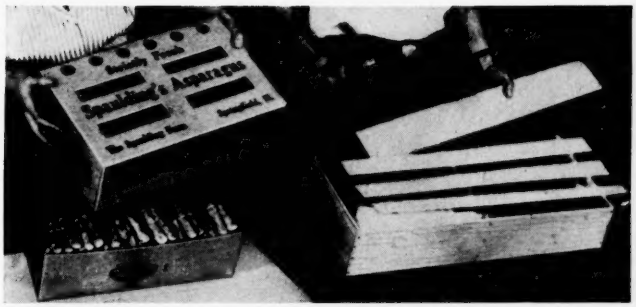
USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

9-1431

UNITED STATES STEEL



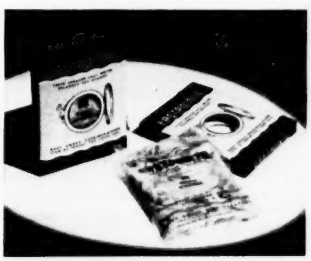
New Use for Corrugated Box

Fresh-cut asparagus is being packed by The Spaulding Farm, Springfield, Ill, in corrugated boxes with slotted sides and vent holes.

The boxes are designed to serve as shipping containers and also as display cases offering sales appeal. Holding twelve 1-lb. bunches of the vegetable, these new cartons are considerably lighter when packed than cartons previously used. In addition, the dozen-unit pack creates a tendency for orders in full dozens—thereby, reducing the extra handling on odd quantities that requires splitting of boxes.

The slots help to keep the asparagus fresh and also permit quick inspection. Inside surfaces of the box are paraffined to prevent any absorption of the natural moisture from the tender shoots. And the box remains strong and rigid.

Gaylord Container Corp., St. Louis, manufactures the package.



Oysters in Plastic Pack

Eastpoint oysters are now being packed in a plastic pouch by the Greenwich Oyster Co., Greenwich, N. J.

The bivalves are taken from Delaware Bay and rushed to the firm's plant for fast cleaning, processing, sorting and packing. After filling and sealing, the liquid-proof pouch is placed in a rectangular-shaped carton printed blue and black. A ship's porthole, die-cut in front and back of the container, affords visibility of the contents.

Packed in their natural juices, the oysters can be merchandised either fresh or frozen. The product is offered in four convenient sizes: 12 standard, stewing size; 10 select, cocktail size; 8 extra select, raw bar size; and 6 frying size.

Shellmar Products Co., Mt. Vernon, Ohio, makes the pouch, which is of Goodyear Pliofilm.

Single-Unit Ham Bag

Considerable saving for meat packers is promised by introduction of a new, patented, single-unit, ham bag, developed by Central States Paper & Bag Co., St. Louis.

The new wrapping method replaces the old way of using three separate sheets with the usual loose ends and the need for binding twice.

The conventional inner greaseproof sheet, the standard rag ham sheet and the outer printed sheet are joined into a bag shaped to accommodate the contours of a ham. Two sizes were found to be satisfactory for all hams. The small type holds the 10-14 lb. variety and the larger unit handles those above that weight.

Packers who have made tests with

(Packages and Products Cont'd)

Discover how wise management releases capital tied up in delivery and transport equipment.

The National Truck Leasing System supplies you with well-maintained and smart-appearing trucks to meet the *exact* needs of your business. We will even arrange to buy your present equipment at a fair price. Your investment in trucks is freed and made available for other business needs. *Your truck operation becomes a direct business expense instead of a capital liability.*

Truck leasing also saves executive time, eliminates maintenance worries and budgets truck costs in advance.

Call the phone number shown in your classified directory under this symbol.

NATIONAL TRUCK LEASING SYSTEM
NTLS

NATIONAL TRUCK LEASING SYSTEM
Dept. I-4 23 E. Jackson Blvd., Chicago 4, Ill.
Have your secretary write today for our booklet explaining the basic advantages of truck leasing.

$1,500 inventory abolished—at a cost of $4.46!

With more than 700 vacuum tubes needed by industry, a tube distributor would find profits consumed by 100% inventories. But by ordering tubes as needed via Air Express, he holds stocks to 25%. Example: Orders **$1,500** tube at 9 A.M. from supplier **900** miles away. Delivered to customer 6 P.M. same day. **16** lbs.: cost, **$4.46.**

Remember, $4.46 *included* speedy pick-up and delivery service, too. *More* protection, because you get a receipt for every shipment. Air Express is the *world's fastest* shipping service.

Your Air Express shipments go by the Scheduled Airlines direct to over 1,000 airport cities; fastest air-rail for 22,000 off-airline offices. Shipments *keep moving* with 'round-the-clock service.

FACTS on low Air Express rates

19 lbs. of machine parts goes **600** miles for **$3.54.**
9-lb. carton of new styles goes **1400** miles for **$3.99.**
(Every kind of business finds Air Express pays.)

Only Air Express gives you all these advantages: Special pick-up and delivery *at no extra cost. You get a receipt for every shipment* and delivery is proved by signature of consignee. One-carrier responsibility. Assured protection, too—valuation coverage up to $50 without extra charge. Practically no limitation on size or weight. For fast shipping action, phone Air Express Division, Railway Express Agency. And specify "Air Express delivery" on orders.

SPECIFY AIR EXPRESS
AIR EXPRESS GETS THERE FIRST

Rates include special pick-up and delivery door to door in principal towns and cities

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND THE
SCHEDULED AIRLINES OF THE U. S.

several hundred thousand of the new containers reported that greater production and a more attractive package were achieved at a considerable saving over older methods.

Rough loose ends were avoided and the printed copy on the outside was always centered. The closing operation, using 5 or 6 in. of acetate fiber tape, is extremely fast.

For Easy Apple Pie Baking

Prepared filling for apple pie is offered in a 1 lb. 14 oz. glass jar by C. H. Musselman Co., Biglerville, Pa.

The product is ready to use, needing no further preparation before putting it in the pie shell. Spices may be added if desired. Each jar contains sufficient prepared apples, sugar, starch and fruit acid for a 9-in., deep-pie plate.

A merchandising program incorporating newspaper ads, a recipe booklet, and a point-of-sale leaflet, is being used to promote this new Applpie.

Attached to the lid of each jar is a "teaser" leaflet containing five apple recipes and the offer of a larger Pennsylvania Dutch Cook Book free to housewives who write to the company. This booklet has 30 highly prized "Dutch" recipes.

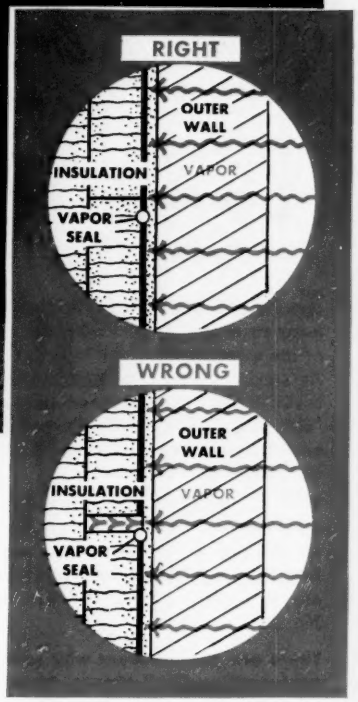
The handy, wide-mouthed jar is manufactured by Owens-Illinois Glass Co.

Chemical Checks Lard Rancidity

Addition of a new antioxidant, Sustane, to animal fats and oils gives protection against rancidity for longer periods of time. The newly introduced compound is stated to be particularly effective in lard.

Stored at ordinary temperatures without oxidation inhibitors, lard usu-

(Packages and Products Cont'd)



Why Tight Insulation Joints Are Important

EVEN A PINPOINT OPENING IN COLD ROOM CONSTRUCTION IS A DANGER POINT

There's trouble ahead when board-type, low-temperature insulation is not erected with tight joints. The openings may be small and well hidden behind the finish, but each is a channel through which heat and moisture can flow into the insulation—a weak spot in the vapor seal.

The complete vapor seal is made up of asphalt priming paint over portland cement plaster, plus the hot asphalt in which the insulation is dipped before erection. This asphalt is a powerful adhesive, holding the insulation firmly to the wall. It also is a vital part of the vapor seal, supplementing the priming paint. If joints between insulation boards are not tight, gaps also occur in the film of asphalt at these points, and the vapor seal is weakened.

Where the vapor seal is weakened, moisture-laden warm air may eventually work its way in. As that air cools, its moisture condenses and may even freeze in the insulation. Over a period of months or years, this continuous process can ruin insulating efficiency and cause failure of the job.

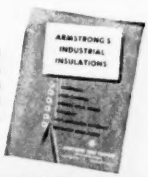
Making your insulation joints tight calls for an accurately-sized board with square edges and corners, such as you get in Armstrong's Corkboard and Armstrong's Mineral Wool Board. It also calls for good workmanship.

Here is where Armstrong's Contract Service can save you future trouble. This organization has been installing insulation for more than 40 years. Its men know how to do a good, tight-fitting job that will seal out damaging moisture and give long and satisfactory service.

The next time you have low-temperature insulation work coming up, it will pay you to phone the nearest Armstrong office and talk it over with an Armstrong Contract Service engineer.

FREE BOOKLET

For information on Armstrong's low-temperature insulations and how they should be erected, write today for your copy of "Armstrong's Industrial Insulations." Armstrong Cork Co., 4207 Concord St., Lancaster, Pa.



ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

From 300° Below Zero

To 2800° Fahrenheit

"The lowest-cost gate valve we have ever used!"

. . . that's what they say about the

LUNKENHEIMER "King Clip" Gate Valve

THE first clip type valve was originally developed many years ago by Lunkenheimer and was one of the most popular gate valves ever designed. As service demands became more severe, the basic design was improved into the present "King-Clip". Twenty-one different patterns are now available for a wide range of service conditions in virtually all industries.

The "King-Clip" is truly the leader of all clip type valves . . . it offers you a money saving solution to many valve problems. See your Lunkenheimer Distributor. He has a stock available to serve you promptly. Write for Circular No. 561.

There are good reasons why so many valve users prefer "King-Clip" Valves. *Note these features:*

- Exceptionally strong body and bonnet construction.
- Extra length pipe threads for a strong, safe joint.
- Sharply tapered disc seats tightly.
- Large, unobstructed channels really drain the bonnet.
- Coarse stuffing box threads provide greater resistance to corrosion and stripping . . . reduce annoyance of leaky stuffing boxes.
- Easy to disassemble and reassemble.
- Exceptionally low maintenance cost.
- In bronze mounted patterns, rolled-in seat rings, integral non-corrodible stem thread bearing and special alloy stem assure longer life.

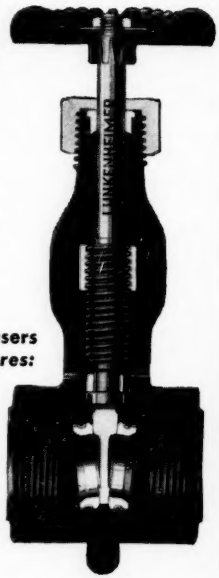


Fig. 1640 Iron Body Bronze Mounted . . . for steam, oil, gas, air, water and gasoline service.

Fig. 1644 All Iron . . . for handling solutions which attack bronze.

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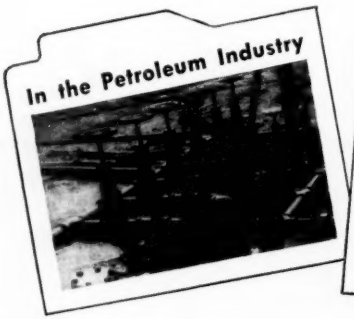
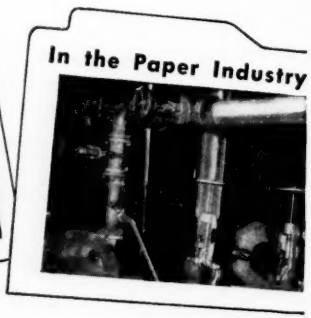




ally turns rancid within a short time. But, when mixed with the new chemical, it is reported to remain in good condition for over a year.

Sustane is a high purity grade of butyl-hydroxy-anisole produced by Universal Oil Products Co., Chicago. The compound is very soluble in oils and shortenings, providing no mixing problems. In required inhibiting concentrations, it imparts no detectable odor, color or flavor to the fats.

The new antioxidant is not greatly affected by slight alkalinity, an advantage in some baking mixes. In addition, it has the unusual quality of carrying through the baking process and protecting the finished goods against rancidity.

Concentration needed to make lard storage-stable and give adequate carry-through to baked goods is about 0.01 percent or 1 lb. to 10,000 lb. lard. Where carry-through is not required, much lower antioxidant concentration is needed.

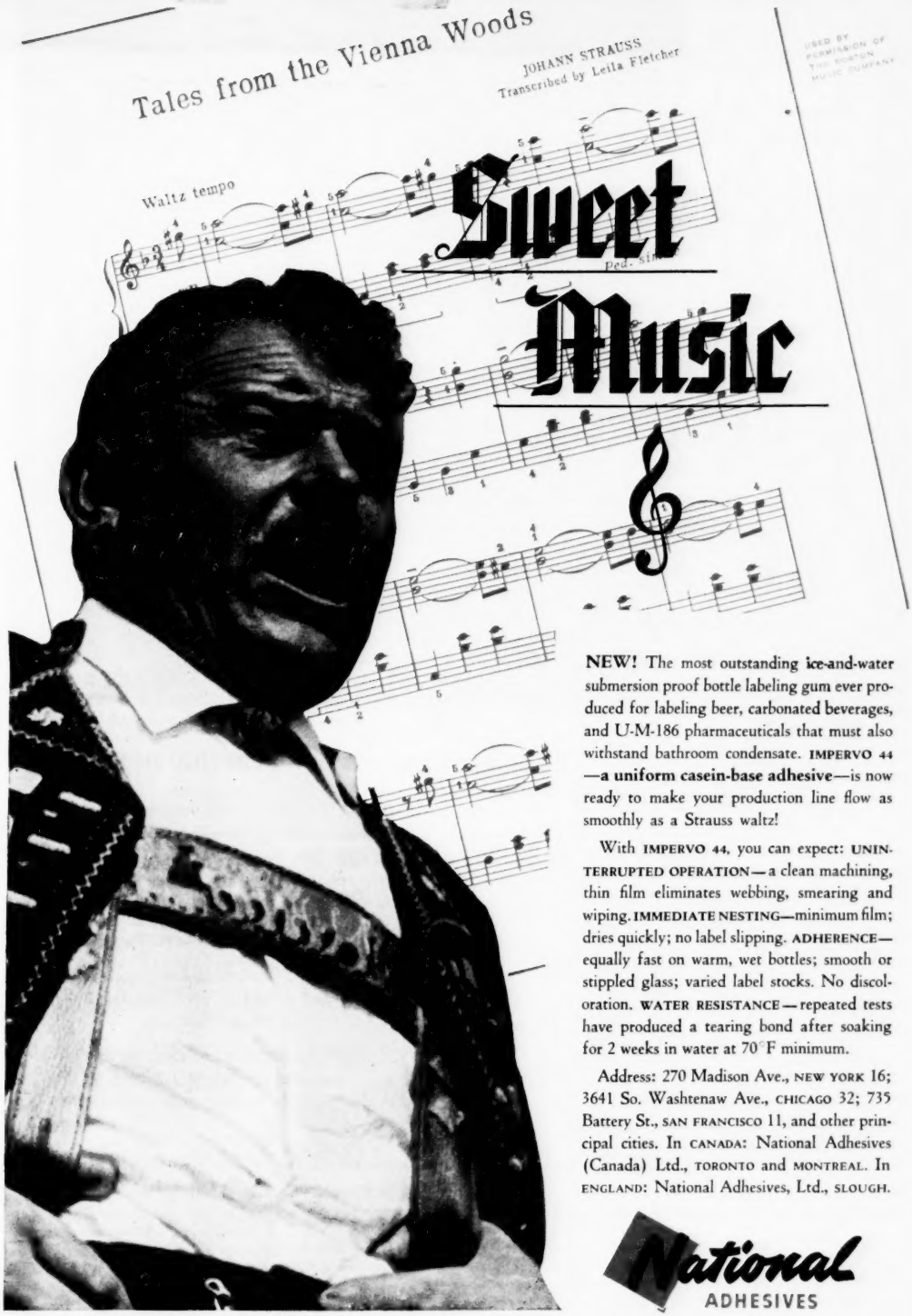
The product has been approved by Meat Inspection Division of USDA in Memorandum 118 issued with the consent of the Food & Drug Administration.

Butter Beans In Clear Sauce

In celebrating its 95th anniversary, the P. J. Ritter Co. of Bridgeton, N. J., has introduced a new lima product, cooked dry butter beans.

This latest "White Label" brand product is made from tender, large California limas cooked in a clear sauce with no added starches. The sauce is reported to be of an outstanding flavor. The beans are ready to heat and serve, and there is no need to add any other ingredients.

—*End*



NEW! The most outstanding **ice-and-water** submersion proof bottle labeling gum ever produced for labeling beer, carbonated beverages, and U-M-186 pharmaceuticals that must also withstand bathroom condensate. **IMPERVO 44 —a uniform casein-base adhesive**—is now ready to make your production line flow as smoothly as a Strauss waltz!

With **IMPERVO 44**, you can expect: **UNINTERRUPTED OPERATION**—a clean machining, thin film eliminates webbing, smearing and wiping. **IMMEDIATE NESTING**—minimum film; dries quickly; no label slipping. **ADHERENCE**—equally fast on warm, wet bottles; smooth or stippled glass; varied label stocks. No discoloration. **WATER RESISTANCE**—repeated tests have produced a tearing bond after soaking for 2 weeks in water at 70°F minimum.

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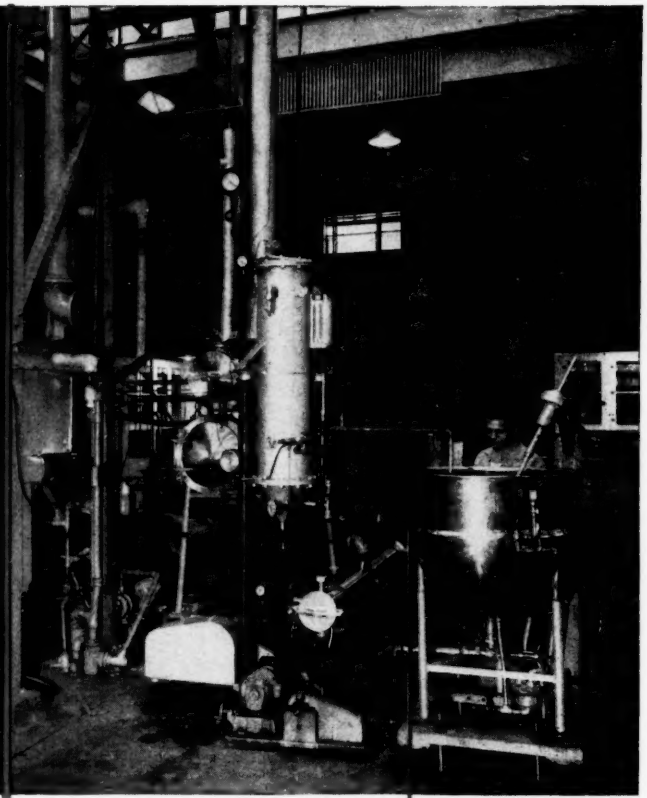

BUFLOVAK AT WORK ON ONE OF OVER 6,000 PROCESSING PROBLEMS

BUFLOVAK Equipment is available to process your product. The results are positive, right from the start. You will know every detail of cost, production, and characteristics of the finished product. This BUFLOVAK service is strictly confidential. Will help you to determine what equipment is needed to most profitably do your work.

The new BUFLOVAK Low-Temperature Evaporator, operating at temperatures as low as 58° F. and at safe pressures, brings improved results to a wide range of delicate liquids.

A complete line of BUFLOVAK Equipment for processing chemicals and foods, including Dryers, Solvent Recovery Equipment, and Processing Equipment, is available to complete your process on a pilot plant scale.

Full information on request.

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Food Industry News

Background For Packers' Wage Problems Furnished By Labor Statistics

A backdrop for next month's major wage negotiations in meat packing plants is being furnished by the Bureau of Labor Statistics. It is a picture of what happened before, when Armour and Swift signed successive master contracts with the three major unions in the industry.

Armour and Swift are the subjects of the sixth and seventh of a series of wage chronologies being issued by BLS covering various industries. All have been approved as accurate by the companies and unions involved. The Armour history was released at the end of June, and the one on Swift will be available this month. They are in the June and July issues of the *Monthly Labor Review*, BLS publication. Reprints of the studies may be obtained by writing to the BLS Publications Office in Washington.

Armour signed its first master agreement with the CIO United Packinghouse Workers in August, 1941, and with the AFL Meat Cutters two years later. Swift has three master agreements—with the CIO, AFL, and the National Brotherhood of Packinghouse Workers (Ind.)—all effective since August, 1942.

All of the agreements come up for renewal August 11.

This is what the study shows:

Postwar wage increases: There have been five general wage raises since the war ended, totaling 42½c. an hr.

Wages: At Armour, the lowest wage for unskilled labor is $1.03½ at Tifton, Ga.; the highest, $1.26 at San Francisco. Most common rate is $1.15. This compares with rates ranging from 54c. to 72½c. in 1941.

Swift's lowest unskilled labor rate is 96½c. at Ocala, Fla.; the highest, $1.26 at San Francisco. Most plants have a $1.15 rate.

Guaranteed time: It has risen from 32 to 36 hr. per week.

Night work premium: None in 1941, 5c. in 1942, 7c. since 1946.

Overtime pay: Since 1942, time and a half after eight hours a day, as well as after 40 hr. a week, as required by law.

Also covered are improvements in such fringe benefits as holiday pay, vacations, sick leave, reporting time, call-back time, clothes-changing time, clothes allowances, tools and equipment, meals and meal time.

At Swift, the CIO represents about 24,000 in 24 plants, the independent union 10,000 in nine plants, and the AFL 5,000 in 11 plants.

At Armour, the CIO speaks for 32,000 in 23 plants and the AFL for 8,000 in 13 plants.

Frozen Food Weight Marks Passed by Officials

Should plastic-wrapped frozen fish fillets be weighed and marked at the processing plant?

Should frozen foods containing both liquids and solids be marked to indicate their solid and liquid contents?

In the fall of 1947, these two questions were debated at great length by the national conference of state, local, and federal weights and measures officials. At their recent 34th annual Conference on Weights & Measures, these same officials took their stand.

On frozen fish, the conference, by a close vote, took the stand recommended by its committee on methods of sale of commodities: The individual package should be exempted from the requirement of net quantity markings on individual consumer packages, provided that the legend "To be weighed at time of sale," or other suitable wording are plainly and conspicuously marked on each individual package.

This modification of marking requirements, the conference decided, should not apply to the main carrying package in which the individual unit packages are contained for distribution. Such packages should continue to carry net weight declarations.

On the frozen food question, there was little discussion. The committee, in making its recommendation to the officials, reported no noticeable changes in frozen food processing or packing to correct questionable procedures, and stood on its recommendation of more than a year ago—the amount of liquids and the amount of solids should both be declared on the package. The conference approved this recommendation.

The positions taken by the enforcement officials on these questions change no regulations. But their recommendations do carry considerable influence with the states or municipalities they represent, and are always considered when state and local legislative bodies consider or enact legislation.

Miami U. Food Course

University of Miami, Fla., opens a new four-year course in Food Technology, in September, with J. Arthur Lewis, associate professor, in charge. Assistant Professor, A. L. Stahl will direct the food laboratory and its research program. Assistant Professor Milton Kaplow will teach the principles of food technology, while Assistant Professor Margaret Jean Mustard will assist Dr. Stahl.

(Industry News Continued)

Enjoy Own Product

While winning of the FOOD INDUSTRIES Award had not been included in advance promotion plans of the Florida Citrus Canners Cooperative, the executives like their product well enough to use it in a toast. From left are: J. L. Heid, director of research and development; L. A. Wheeler, sales manager; Kay Kamen, representing Disney licensing agency; D. A. Hunt, F. C. C. C. president; and Monroe Greenthal, ad agency head. The award is being made at the IFT meeting this month.

IFT Conference Will Break All Records In Technical Papers and Exhibits

Months of preparation have gone into the stage setting for the Institute of Food Technologists' first visit to the West Coast. The Northern California Section, cooperating with the national convention committee, has arranged a four day program that should meet the demands of every food technologist visiting San Francisco during the week of July 10, for the Institute's ninth annual conference.

Technical discussions get underway Sunday afternoon, July 10, with a seminar on pectin standardization. General and concurrent sessions run through Monday, including Monday evening, all day Tuesday, and Wednesday and Thursday mornings. The sessions will be interrupted Monday by the FOOD INDUSTRIES' Award presentation and the Stephen Babcock Award luncheon. The convention banquet and the Nicholas Appert Award is scheduled for Tuesday evening. Wednesday afternoon is reserved for sightseeing and Thursday afternoon for plant trips.

In all, 110 papers have been prepared for the meeting and will cover practically the whole field of food processing. Opening on a broad base, the first general session will hear papers presented by Mogus Jul, Food & Agriculture Organization of the United Nations on "The Food Technologist and the World Food Crisis," and Harry R. Wellman, U. of California, on "Stabilizing Farm Prices." Secretary Roland Isker, Associates, Food & Container Institute, will conclude the session with "Food Industry Cooperation with the Armed Forces."

Florida Citrus Canners Cooperative receives the bi-annual FOOD INDUSTRIES Award at a special meeting following the first general session (see page 67, while the annual Stephen Babcock Award will be made to Clarence Birdseye at the Monday luncheon. This year's Nicholas Appert award, made by the Chicago section of IFT, goes to Roy C. Newton, Swift & Co.

Concurrent sessions on Monday afternoon and evening, Tuesday, Wednesday and Thursday mornings offer the visitors a busy three days. For the most part the visitor will have to choose between discussions on operation and production, and results of investigations made on specific fruits, vegetables and other foods. The Monday evening program, for instance, covers (a) Advanced Food Plant Engineering, (b) Brewers Yeast, (c) Citrus Products, (d) Education, (e) Fish and Fish Products (f) Pickles and Pickled Products, (g) Plant Sanitation, (h) Preservation with Gases, and (i) Processing Potatoes.

More than 75 exhibitors will provide by far the largest exposition in the short history of IFT. Manufacturers of equipment and materials will utilize the main floor of San Francisco's civic auditorium, displaying recent advances and developments in machinery and supplies for the food processing industry.

The Institute will also operate an employment clearing service at the meeting, with a view to bringing together employers and food technologists interested in new positions. Processors wishing to use the service are expected to get in touch with the committee on employment at the meeting. Candidates for employment will register at the meeting.

Plant Engineering Talks Get Top Flight Panel

Advantages, problems, and trends of advanced food plant engineering will be discussed by well-known executives and technologists at the 9th annual meeting of the Institute of Food Technologists, in San Francisco.

These authorities will be members of the panel of the Advanced Food Plant Engineering Group, which will hold its session from 7:30 to 10:30 p.m. July 11, in Polk Hall, Civic Auditorium. They will present the viewpoints of top management, plant operations, technology, education, equipment, and finance. And after each panel member talks briefly, the session will be open for questions from the audience and discussion.

The panel members include:

J. W. Tapp, Vice-President, Bank of America.

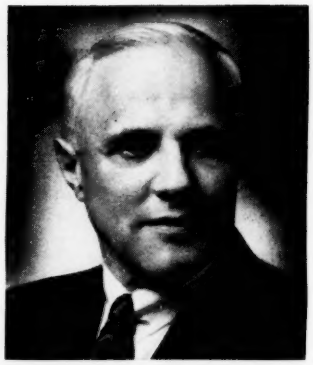
J. R. Braden, Richmond-Chase Co.

Bruno Pilorz, Operating Manager, California Packing Corp.

W. V. Cruess, Division of Food Technology, U. of California.

Wm. DeBack, Manager, Anderson-Barngrover Div., Food Machinery Corp.

The chairman of the advanced food plant engineering discussion group will be F. K. Lawler, Editor of *Food Industries*.



McGraw-Hill Director

Karl T. Compton, chairman of the corporation Massachusetts Institute of Technology and chairman of the Research and Development Board of the National Military Establishment, was recently elected a director of McGraw-Hill Publishing Co. The company is highly gratified to obtain Dr. Compton's counsel in the publication of its technical books and magazines.

PictSweet Sells Plants In Reorganization

In a sweeping reorganization PictSweet Foods, Inc., Mt. Vernon, Wash., reported the sale of its canneries at Buhl, Ida., and Ellensburg, Wash., and its frozen food and canning plant at Waitsburg, Wash. Price was reported to be $1,040,000.

Formerly known as Bozeman Canning Co., a name taken from the Montana town in which the company originated, PictSweet Foods Inc., under the direction of L. L. Brotherton, president, became the dominant frozen food packer on the Pacific Coast. The company's distribution of canned peas and corn was also of importance on the Coast and in some midwestern and eastern markets.

Reports are that PictSweet will now become largely a producer of frozen foods.

Canning Plants Taken Over By Pennsylvania Co-op

Grower-members, management, and employees are the principal stockholders in the newly organized Knouse Foods Cooperative, at Peach Glen, Adams County, Pa. The capital stock authorization is $3,000,000.

Under the direction of company president, M. E. Knouse, the cooperative has taken over the Peach Glen and Chambersburg plants of the National Fruit Products Co., the Orrtanna plant of the Orrtanna Canning Co.,

and the Scotland, Pa. plant of the Chambersburg Fruit Cooperative Assn. Combined annual production capacity of the four plants is approximately 4,000,000 cases.

Processing will be devoted largely to apples, tomatoes, cherries and their products. An experimental and research laboratory will also be maintained at Peach Glen.

Citrus Purees Developed By USDA Research Lab

Bakeries, ice cream manufacturers, and producers of jams, marmalades and jellies, have shown interest in the frozen orange and lemon purees made by a process developed at the Pasadena, Calif. research laboratory of USDA's bureau of agricultural and industrial chemistry. The department reports that 1,000,000 lb. were produced by a commercial firm last year, and that last summer one large dairy sold 750,000 lb. of sherbert made from the frozen orange puree.

The new process has enabled bureau scientists to overcome the development of off-flavors in storage. This off-flavor tendency—due to citrus-peel oil—has been the principal obstacle in the production of citrus purees. A few experimental packs were put up by the lab in 1947. After a year's storage at zero F., the product was found to be in excellent condition. Not only had no off-flavors developed, but losses of vitamin C were negligible.

In the process, sound ripe fruit is first thoroughly washed—preferably with a detergent—rinsed in cold water and dried. The stem end of the fruit is cut off and discolored spots are removed from the fruit so that no dark specks will appear in the brightly colored puree. After trimming, the whole fruit is cut up, crushed, and then screened to produce the puree. The final product contains less than 1 percent peel oil. It is then passed into a stainless steel tank, where 1 part sugar to 5 parts puree is added.

Alcohol-Yeast Process Hailed in Australia

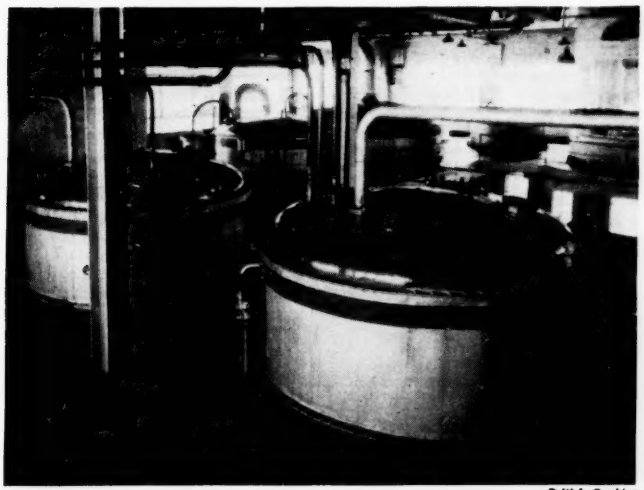
Bakers' yeast production in commercial quantities under the "Deloffre Alcohol Process" is attracting food industry attention in Australia.

A highly concentrated sugar solution is inoculated with a small culture of pure yeast, which is then fermented to produce a maximum quantity of alcohol. The alcohol is used to form yeast under conditions that permit the yeast to absorb the alcohol.

In the early years of the process' development beet molasses served as the raw material. During the war, however, a technic for using wheat starch was developed.

Some of the advantages claimed for his process by M. C. H. Deloffre, a French industrial chemist who transferred to Australia in 1929, include the sterile conditions under which fermentation takes place, and the high keeping quality of the yeast because the alcohol reduces the protease enzyme content of the yeast.

(Industry News Continued)



British Combine

Aussie Yeast From Alcohol

Pipelines are shortened to a minimum in this Australian plant where an alcohol process used in manufacturing yeast is said to be highly satisfactory. Beet molasses has given way to wheat starch as the raw material for the process.

Everyone has problems

If yours happens to be leavening...

Investigate

VICTOR SODIUM ACID PYROPHOSPHATE

In the manufacture of prepared doughnut flour, cake mixes, commercial baking powders, and baking creams, the problem of selecting the most suitable baking acid is of major importance. For upon it largely depends the success or failure of the baked product. Due to its highly efficient leavening action, Victor sodium acid pyrophosphate has often provided the solution to a leavening problem. It produces increased volume, lightness and a highly desirable grain and texture in the baked product.

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Investigate Now! MAIL THIS COUPON TODAY!

Victor Chemical Works
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Gentlemen:
We are interested in information about Victor sodium acid pyrophosphate for the following purpose

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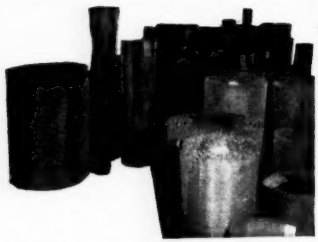
call Cambridge for INDUSTRIAL WIRE CLOTH OR SCREEN ...from 4" opening to 20x250 mesh



Whether you need material for filtration, screening or fabrication, Cambridge offers you one complete source for any type of wire cloth or metallic screen. Skilled Cambridge craftsmen produce your material from any gauge metal or alloy, to the particular mesh or weave that best suits your requirements.

Call in your Cambridge Field Engineer whenever you need industrial wire cloth. He can offer you *fast delivery on stock or specially woven items.*

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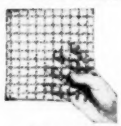

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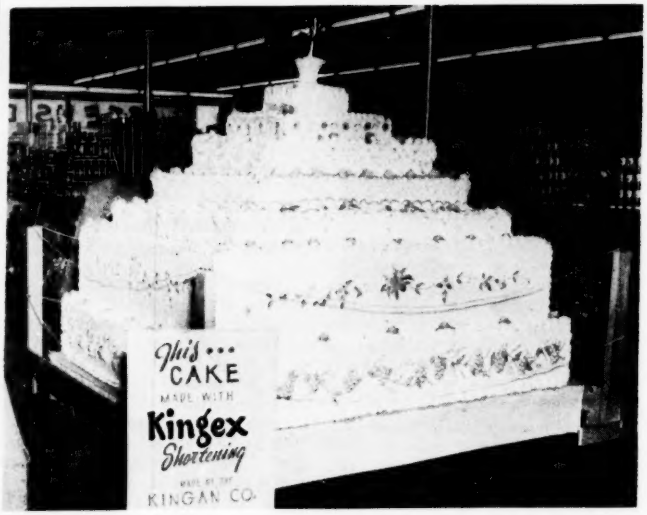


Only a First Birthday

It is presumed that cake sizes will have to stop somewhere, but up to now it is only a presumption. This 5,500-lb. contribution was "built" to help celebrate the first birthday of the B. F. Sherman Super Market, at Kalamazoo, Mich. Kingan & Co., Indianapolis meat packers, sponsored the party while also publicizing their shortening, 600 lb. of which was used in the cake.

DISTRIBUTION

Base-Point Moratorium Blocked by New Bill

Just as a one-year moratorium on anti-trust prosecution of companies using delivered prices was ready to slide through both the House and Senate, Senator O'Mahoney, long-time anti-monopolist, introduced a completely new bill as an amendment to the moratorium bill (S. 1008)—and got it through the Senate the same day.

As it passed the Senate, the bill:

1. Legalized individual use of delivered pricing, but

2. Did not legalize basing-point pricing as used in the steel or cement industries, nor change the "implied conspiracy" decision in the Rigid Steel Conduit case.

Here is how various pricing methods seem to measure up under the O'Mahoney bill:

1. Basing point pricing has not been legalized.

2. Freight equalization systems, in which every mill is a base mill, is certainly not cleared per se. FTC will continue to look at the competitive situation in any industry—and would apply its "planned common course of action" theory to win cases where it could not prove overt conspiracy.

This system, or any other delivered price system, can still be successfully attacked by FTC if it can prove that the companies use the system knowing that all their competitors are using the same system.

3. Individual use of a universal delivered price—"postage stamp pricing"—seems completely in the clear. The bill legalizes the chewing gum, candy bar, and cigarette kind of pricing, when done individually.

Anti-Trust Still Holds

4. Individual zone systems, not adhered to by competitors, will be subject to the same anti-trust scrutiny they got before. That is, FTC will look for discrimination in the different delivered prices paid by competing customers who happen to be on opposite sides of a zone boundary. The O'Mahoney bill would remove the question of discrimination between competing customers in the same zone, because they would all be paying the same delivered price.

In one respect, the O'Mahoney bill does make new law. As the anti-trust laws stand now, "meeting competition in good faith" is generally a valid defense against a charge of price discrimination. But in a test case (against Standard Oil Co. of

Indiana) which the Supreme Court may yet decide this term, FTC claimed that the "good faith" defense is not sufficient if there is "substantial injury to competition." The O'Mahoney bill would write this FTC interpretation into law—even though FTC has gone on record favoring making "meeting competition in good faith" a complete defense against charges of price discrimination.

Another important point was made clear in an amendment to O'Mahoney's original draft: The bill as passed will not change in any respect the present situation on court review of FTC's decisions. Under the Administrative Procedures Act, the decisions of FTC and other regulatory agencies are upheld by the courts if their decisions are based on "substantial and probative evidence." O'Mahoney's bill reiterates this.

Britain Resumes Buying Of U. S. Canned Fish

During 1948, the British bought no canned fish in the U. S.—for the first time in 70 years. But now, with ECA authorizations approved, Britain will begin buying $4,850,000 worth of pilchards. And there is also a possibility that the British will get an ECA authorization to purchase $6,000,000 to $7,000,000 worth of salmon in the U. S.

Besides these authorizations for U. S. canned fish, ECA has approved British purchase of about $7,150,000 worth of canned salmon in Canada.

The ECA authorizations amount to about one-fourth of Britain's prewar annual purchases in the U. S. At current prices, the prewar volume of British buying per year would run to about $20,000,000 for salmon, and about $900,000 for sardines. The canned fish purchases are being made by the United Kingdom Treasury & Supply

(Industry News Continued)

"Now who the devil would be interested in canned whole watermelon?"

Announcement

FRANK D. PALMER, Inc., CHICAGO

is now a division of

PACKAGE MACHINERY COMPANY

SPRINGFIELD, MASSACHUSETTS

Through a recent consolidation, Frank D. Palmer, Inc. of Chicago has become a division of the Package Machinery Company of Springfield, Massachusetts.

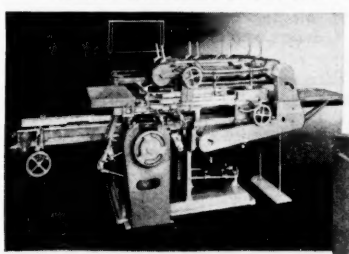
The Package Machinery Company's extensive line of wrapping machines serves a large number of the users and potential users of Palmer carton forming machines. By uniting our organizations we are, therefore, in a better position than ever to render a broad service to the packaged goods industry.

The sales staffs of both organizations will continue unchanged, each specializing in its particular field.

If you are seeking greater economies and a better selling package through improved cartoning and wrapping methods, get in touch with our nearest office.

PACKAGE MACHINERY COMPANY, Springfield 7, Massachusetts

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.



Model FA
High-Speed Adjustable Wrapping Machine.
The most widely-used wrapping machine in the packaged goods field.

Palmer *Continuous Motion* Carton Former.
Delivers perfectly formed and sealed cartons at speeds as high as 135 per minute.

PACKAGE MACHINERY COMPANY

Over a Quarter Billion Packages per day are wrapped on our Machines

Greater Service to Fork-Truck Users

Greater Opportunities for Men Who Sell Them—

Clark Dealer Plan Achieves **Both**

WITH sales of its fork-lift trucks and industrial towing tractors exceeding all expectations, and with its position of production and engineering leadership firmly rooted in rich, productive soil, Clark Equipment Company, in its 30th year as a builder of materials-handling machines, has found it desirable to establish a nation-wide organization of independent franchised dealers as exclusive distributors of the products of its Industrial Truck Division.

THIS is indeed a far cry from 1939 when the entire output of the Industrial Truck Division was sold with ease by a handful of men!

TODAY'S volume is twenty times that of 1939; and the Company's stature—financial and engineering—is more than twenty times as great as in 1939. A considerable number of the '39 machines are in daily service, and many older machines are in regular operation after 20 and 25 years. The conviction is natural that 30 years hence many '49 machines will still be "on the job" alongside the new output of 1979. There will be no "orphans" bearing the name "Clark."

TO KEEP PACE with increasing demands, and to deliver the broad and competent service which Industry expects from Clark, the Company has chosen this plan of selling through independent dealers as a sound and logical evolution. Until the middle of 1948, approximately one-third of Clark's Industrial Truck Division representatives were on an independent dealer basis. It is expected that by the end of 1949 the nation-wide dealer organization will be complete.

HEADING up the dealerships or actively participating in them are key men of Clark's erstwhile factory-branch sales offices—factory-trained men, tested and proved as capable materials-handling counselors. These men share with Clark management the conviction that they can deliver, under the new plan, a broader and more valuable service to their customers and to all users of mechanized materials-handling; that they face broader, deeper vistas of opportunities which ambitious men so earnestly desire—opportunities for independence, for building greater earnings by their own efforts, for achieving prestige and leadership in their communities.

ANOTHER influence which furthered the plan is the fact that Clark management historically has been engineers and manufacturers. By decentralizing marketing activities, Clark can intensify its emphasis on development of better materials-handling machines and methods—to the end that Clark products shall achieve even higher excellence at lower cost, shall become still more valuable to industrial users and to the dealers who serve them.

THROUGH your Clark dealer, all the advantages of Clark engineering, integrated production and matchless experience are quickly available to you. He is fully qualified to make an unbiased appraisal of your materials-handling operations, and to recommend the type of machine that will serve you most efficiently at lowest cost. It's "good business" to CONSULT CLARK.

CLARK EQUIPMENT COMPANY

INDUSTRIAL TRUCK DIVISION

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OTHER PLANTS—BUCHANAN • JACKSON • BERRIEN SPRINGS, MICHIGAN

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ARIZONA: PHOENIX
ROBERT H. BRAUN COMPANY
743 GRAND AVENUE

ARKANSAS: LITTLE ROCK
FRED J. VANDEMARK COMPANY
209 EAST MARKAM STREET

CALIFORNIA: FRESNO 1
ROBERT H. BRAUN COMPANY
505 MASON BUILDING

LOS ANGELES 23
*ROBERT H. BRAUN COMPANY
3008 EAST OLYMPIC BLVD.

OAKLAND 3
*GLEN L. CODMAN COMPANY
10521 PEARMAIN STREET

SAN DIEGO
ROBERT H. BRAUN COMPANY
3872 FIFTH AVENUE

STOCKTON
GLEN L. CODMAN COMPANY
409 BELDING BUILDING

COLORADO: DENVER 2
*J. N. MEADE
420 U. S. NATIONAL BANK
Service: FORK LIFT TRUCK SERVICE
2855 WEST 8TH AVENUE

CONNECTICUT: NEW HAVEN
*C. E. REUTTER CORPORATION
66 AMITY ROAD

FLORIDA: TAMPA
CLARK EQUIPMENT COMPANY
1145 ELLAMAE STREET

ILLINOIS: CHICAGO 4
*MODERN HANDLING EQUIP., INC.
310 SOUTH MICHIGAN AVENUE
(***Service: Cook County***)
LIFT TRUCK SERVICE COMPANY
6919 SOUTH HALSTED STREET

INDIANA: INDIANAPOLIS 5
*W. A. MARSCHKE & SONS
1121 E. 46TH STREET

SOUTH BEND 14
*MATERIALS HANDLING EQUIP. CO. OF SOUTH BEND, IND.
2625 SOUTH MICHIGAN STREET

IOWA: DAVENPORT
*BIG RIVER EQUIPMENT CO.
1344 WEST THIRD STREET

DES MOINES
*BIG RIVER EQUIPMENT CO.
914 GRAND AVENUE, ROOM 255

KANSAS: KANSAS CITY
Sales and Service:
(SEE KANSAS CITY, MISSOURI)

LOUISIANA: NEW ORLEANS
T. G. FRAZEE
910 CARONDELET BLDG.

MAINE: PORTLAND
BRODIE INDUSTRIAL TRUCKS, INC.
(CONTACT MALDEN, MASS.)

MARYLAND: BALTIMORE
FALLSWAY SPRING & EQUIPMENT CO.
CORNER FALLSWAY & LEXINGTON

MASSACHUSETTS: BOSTON (MALDEN 48)
*BRODIE INDUSTRIAL TRUCKS, INC.
50 COMMERCIAL STREET, MALDEN 48

MICHIGAN: BATTLE CREEK
CLARK EQUIPMENT COMPANY
INDUSTRIAL TRUCK DIV. PLANT

DETROIT 2
*CLARK EQUIPMENT COMPANY
6520 CASS AVENUE
Service: INDUSTRIAL TRUCK SERVICE, INC.
8815 HARPER AVENUE

MINNESOTA: MINNEAPOLIS 2
*MATERIAL HANDLING ENGINEERS
225 SOUTH 5TH STREET, ROOM 201
Service: SMITH-DUNN COMPANY, INC.
2301 UNIVERSITY AVENUE, S. E.

MISSOURI: KANSAS CITY 6
*CLARK EQUIPMENT COMPANY
1009 BALTIMORE AVENUE
Service:
LIFT TRUCK SERVICE & SUPPLY
NORTHWEST 15TH AND McGEE STREETS

ST. LOUIS 8
*MATERIALS HANDLING EQUIPMENT CORP.
3820 WASHINGTON BLVD.
Service:
FORK LIFT TRUCK SERVICE CO.
511 CHANNING STREET

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*JERSEY INDUSTRIAL TRUCKS, INC.
34 EXCHANGE PLACE
Service:
BOND INDUSTRIAL MAINTENANCE CO.
51 CLARKSON STREET AT GREENWICH
NEW YORK 14, NEW YORK

NEW YORK: BUFFALO
*BRODIE INDUSTRIAL TRUCKS INC.
1450 MICHIGAN AVENUE
NEW YORK 6
*BOND INDUSTRIAL EQUIPMENT CO.
165 BROADWAY, ROOM 2200 (OFFICE)
Service and Display Room:
51 CLARKSON STREET AT GREENWICH
NEW YORK 14—also
289 BOND STREET, BROOKLYN 31
SYRACUSE
BRODIE INDUSTRIAL TRUCKS INC.
712 STATE TOWER BLDG.
ALBANY (WATERVLIET)
*INDUSTRIAL TRUCK SALES, INC.
BROADWAY AT 25TH, WATERVLIET

NORTH CAROLINA: GREENSBORO
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629 SOUTH SPRING STREET

OHIO: CINCINNATI
ROBERT C. YOUNG, P. O. BOX 96
CLEVELAND
CLARK EQUIPMENT COMPANY
522 ROCKEFELLER BLDG.
TOLEDO 10
PERCIVAL L. REYNOLDS, 2558 FULTON STREET

OKLAHOMA: TULSA
ARST EQUIPMENT COMPANY
34 NORTH MADISON

OREGON: EUGENE
PRESTON FALLER COMPANY
891 TAYLOR STREET
PORTLAND 5
PRESTON FALLER COMPANY
1220 S. W. MORRISON STREET

PENNSYLVANIA: PHILADELPHIA 8
*CLARK EQUIPMENT COMPANY
401 NORTH BROAD STREET
Service:
PHILADELPHIA ENGINE REBUILDERS, INC.
330 WEST QUEENS LANE
PITTSBURGH
*MATERIAL HANDLING INCORPORATED
319 THIRD AVENUE

SOUTH DAKOTA: SIOUX FALLS
CENTURY EQUIPMENT & SUPPLY CO.
22 WEST 7TH STREET

TENNESSEE: MEMPHIS 3
*FRED J. VANDEMARK COMPANY
1110 UNION AVENUE

TEXAS: DALLAS
*T. G. FRAZEE
1012 FIRST NATIONAL BANK BLDG.
Service:
TRUCK EQUIPMENT COMPANY
2409 COMMERCE STREET
HOUSTON
*T. G. FRAZEE, 810 PETROLEUM BLDG.

UTAH: SALT LAKE CITY
A. J. ISAACSEN, JR.
45 SOUTH 3RD WEST STREET

VIRGINIA: NORFOLK
*McLEAN-SHAND, INC.
955 WEST 21ST STREET

WASHINGTON: SEATTLE 1
*PRESTON FALLER COMPANY
1921 MINOR AVENUE
SPOKANE 9
PRESTON FALLER COMPANY
EAST 41 GRAY AVENUE

WISCONSIN: MILWAUKEE 2
*CLARK EQUIPMENT COMPANY
759 NORTH MILWAUKEE AVENUE, ROOM 623
Service: LIFT TRUCK SERVICE CO.
5710 WEST NATIONAL AVENUE

DISTRICT OF COLUMBIA: WASHINGTON
CLARK EQUIPMENT COMPANY
927 15TH STREET N. W.

TERRITORY OF HAWAII: HONOLULU
*PRESSED STEEL CAR COMPANY
538 REED LANE, P. O. BOX 300

*Sales and Service.

For Names and Addresses of Export Distributors, write to: Export Division, Clark Equipment Co., Battle Creek, Mich., U.S.A.

Delegation, 1800 K St., NW, Washington, D. C.

Other canned goods purchases have been small. Belgium, during the first quarter of this year, bought $200,000 worth of canned vegetables, and recently got another $100,000 authorization for this purpose. There have been some purchases of canned fruits by Belgium, Ireland, and other countries, but these have been even smaller than the canned vegetable buying of the Belgians.

Institute Reorganizes Packaging Groups

Fifteen active and five projected committees came out of the Packaging Institute's recent committee reorganization. The Foods Committee and the Glass Committee are probably the two most important to the food processor.

The work of the foods group is to develop procedures for determining the type and degree of protection required for dried foods. Eight companies are represented on this committee, which is under the chairmanship of Louis A. Howard, head, Department of Food Technology, University of Illinois. Companies include A&P Tea Co., American Viscose, General Foods, Peter Cailler Kohler, American Can, Pillsbury, Marathon and Armour.

The Glass Committee will attempt to outline a general procedure to screen incoming shipments of packaged glass containers in order to eliminate faulty units that will not go through production lines. Companies represented on this committee include Ely Lilly, Beech Nut, Bristol-Meyers, Hartford Empire, Birds Eye-Snider, Anheuser-Busch, Wheaton, Squibb and Anchor-Hocking.

Huge Crop and Carryover Brings New Wheat Glut

This summer's wheat is headed for a glut. But it isn't likely to be repeated next year. Acreage controls to cut down production are sure to be applied to next year's wheat crop as part of the farm price support program.

But while it lasts, the crisis of handling this year's 1,300,000,000 bu. wheat crop—likely to be the second biggest in the country's history—will tax the tempers of farmers, grain merchants, railroads, and the Department of Agriculture.

The prospective wheat glut has caused the price of wheat futures to fall below the support price the farmer could get from the government, because unless the grain is properly stored, it will bring only a 75 percent loan. So, many farmers, unable to find public storage space and unable or unwilling to build storage of their own, will simply sell their unstored wheat for whatever price the market will bring. This "distress" wheat will bring cash wheat prices below government support levels—a situation that the wheat futures market has long anticipated.

The flour millers always have their inventories at a minimum at this time of year—and are expecting to buy much of their wheat at below government support prices this year as they did last year.

It is this price situation which the Democrats last fall were able to turn to political advantage. They blamed the Republicans for taking away the Commodity Credit Corporation's storage-building authority—and claimed that this was the reason many a farmer had to accept a lower price for his grain.

The political question, of course, is whether the Democrats will be able to turn this year's repeat performance to their political advantage in the 1950 elections.

Harvest Starting

The harvest period begins in July, as the combines start pouring the winter wheat crop out of Texas, Oklahoma, and other Southwestern states. From then on, the harvest moves northward through the big wheat states of Kansas and Nebraska and into the Dakotas.

The railroads this year are prepared as never before to handle the huge movement. Before the harvest began, the railroads had 21,000 box cars stored at country loading points. But as early as the first of June, a limited embargo on shipments to certain centers was already in effect. Its purpose: to prevent the shipment of grain to certain terminals unless the shipper already had storage space available for his wheat.

The embargo was sure to spread—and the possibility of complete embargoes against any shipments into certain terminal points was a real one.

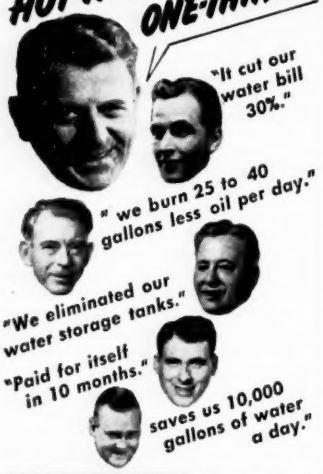
The reason for the wheat jam is simple. With the second biggest crop in history beginning to move, there is less storage space available than a year ago, because of a big carryover from last year's crops.

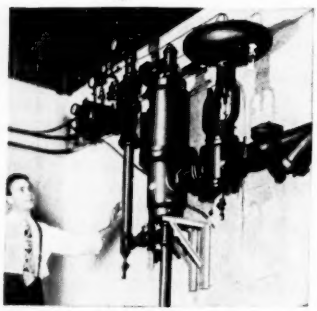
In the Southwest, for example, terminals were half full of old grain at the end of April, compared with last year when they were only one-third full.

On top of this, export demand for wheat is dropping off, as a result of crop recovery in Europe. During the first five months of this year, about

(Industry News Continued)

"I CUT HOT WATER COSTS ONE-THIRD!"


"It cut our water bill 30%."
" we burn 25 to 40 gallons less oil per day."
"We eliminated our water storage tanks."
"Paid for itself in 10 months."
saves us 10,000 gallons of water a day."



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STEAM INJECTION
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Canning Crop Samples

Varying climatic conditions are provided for the study of diseases of canning crops at the Del Monte Experimental Seed Farm, of California Packing Corp. Soil heating cables, produced by General Electric, enable Dr. W. J. Virgin to keep tabs on diseased tomato plants, shown here in one of the hotbeds.

230,000,000 bu. of all grains were exported. March shipments were an all-time record. But, the Department of Agriculture's export program for June called for only 28,000,000 bu. for export, about one-half the monthly rate of shipments established during the earlier months of this year.

Part of the wheat jam results from the fact that last year's wheat—364,000,000 bu.—placed under price-support loan by farmers could not be taken over by the government until April 30. Part of this wheat was in terminal elevators, part still on farms and in country elevators.

The Department concentrated on moving the farm-country elevator wheat during May. But out of 55,000,000 bu. of wheat moved during May, only 34,000,000 bu. moved to the ports for export, the balance going to terminals, lakeheads, Chicago, and Eastern elevators.

Floating Fish Cannery Up For Sale by RFC

The *Pacific Explorer,* 7,254-ton floating fish cannery and reduction plant, and the combined trawlers and tuna clippers Oregon and Alaska, have been put on the block by the Reconstruction Finance Corp. Sealed purchase bids will be received up to July 15.

Conversion of the *Pacific Explorer* from the freighter *Mormacrey* to a mothership for the Pacific Exploration Co.'s fleet of combined trawlers and tuna clippers cost more than $2,000,000. Its feeder ships, the 91-foot *Oregon* and *Alaske,* cost $285,000 each. The ships have been operated for two seasons on exploratory fishing missions under the RFC by the Pacific Exploration Co. of Astoria, Ore.

The 410-ft. *Pacific Explorer,* now idle at Astoria, is equipped with refrigerated cargo space of 166,000 cu.ft., a meal-reduction plant, a crab cannery, and ice-making equipment.

Flavoring Producers Check on Materials

A review and clarification of industry problems characterized the program of the 40th Annual Convention of the Flavoring Extract Manufacturers' Association of the United States, in Chicago, May 15 to 18.

Availability of raw materials, pending legislation, marketing and industry status were among the subjects discussed.

H. P. Wesemann, president, Essential Oils Association of America, Inc., called attention to moves to put essential oils in a separate freight tariff classification and to increase rates as much as six times the current rates. He expressed encouragement that rates may continue at present levels or, at most, be only slightly increased on the F.O.B. shipping point basis. He also announced that a complete list of coined names and trademarks for essential oils and essential oil products is being compiled to eliminate possibility of products of same composition being unsuspectingly purchased under different names.

Lemon oil was reported to be adequate in supply for all needs, with some export to Italy.

Orange oil produced in Florida reached 3,000,000 lb., with several export shipments to Italy.

Grapefruit oil of good quality is difficult to obtain.

Lime oil production in Mexico is expected to be 40 percent below last year, with no stocks carried over.

Bergamot, mandarin and tangerine oils have shown no new developments.

Peppermint and spearmint oils are in ample supply with inventory losses marked off.

Cassia and anise oil supplies are dependent upon political conditions in China.

Clove oil shows no relief from high prices.

Nutmeg oil supply is not plentiful; raw material is scarce, and yields remain low.

Ginger oil will be affected by shortage of ginger root from Africa and Jamaica.

Coriander oil supply comes from Russia, and that experimentally produced in Western Hemisphere is not satisfactory in quality.

Dill oil consumption is rapidly increasing, with production not keeping in step.

Vanilla Bean Supply

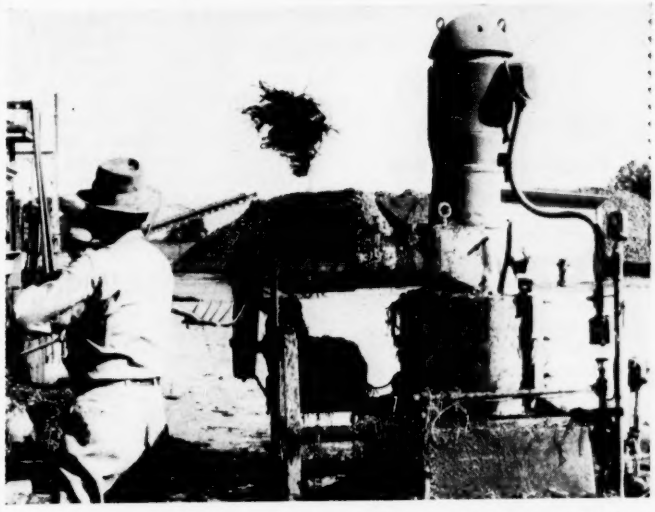
Ray C. Schlotter, secretary, Vanilla Bean Association of America, discussed the vanilla bean market situation. He stated that the Madagascar supply is subject to a controlled market squeeze that has already resulted in the destruction of 1,200,000 lb. These beans would have been marketable in the United States on a free market basis. Mexican 1949 crop is estimated at 250,000 lb. minimum and 300,000 lb. maximum (in comparison with 700,000 lb. last year) of which 27,000 lb. have already been shipped to the United States. Total U. S. A. imports in 1948 were 663,000 lb. from Mexico and 203,000 lb. from Madagascar.

Sievers W. Susmann, vice-president, Meinrath Brokerage Co., gave assurance there would be adequate supply of sugar for next few years. The 1949 world production is estimated to reach an all-time high, 9 percent greater than the 1935-39 average. Crops in Europe, exclusive of Russia, are only 2 percent less than prewar average, which will reduce Eastern Hemisphere requirements from Western Hemisphere.

R. Henry Morris, III, Eastern Regional Research Laboratory, discussed the potentiality of volatile fruit concentrates as flavoring materials. Particular emphasis was placed on what has been accomplished with volatile

(*Industry News Continued*)

the Rietz DISINTEGRATOR DOES ANOTHER TOUGH JOB



Waste converted to dollars by producing stock feed from sugar beet trash.

MANY similar difficult jobs are being done by the Rietz Disintegrator with integral Prebreaker. Here are several—

- Shredding Grape Stems for Sugar Recovery
- Reducing Lettuce Waste for Disposal
- Pulverizing Green Bone for Dog Food
- Shredding Citrus Waste for Feed
- Pulping Pineapple Cores for Juice
- Reducing Fresh Fish to a Slurry
- Reducing Frozen Meat for further Processing
- Reduction of Bulky Cannery Waste for Disposal or for Feed Production
- Production of Fruit, Vegetable and Meat Puree for Baby Foods

These are just a few—We serve the food and food by-products industry with equipment to meet the most exacting services. If you have any "Hard to solve" grinding, pulverizing, shredding or pulping problems—wet or dry—send us details and we will make recommendations at no obligation to you.

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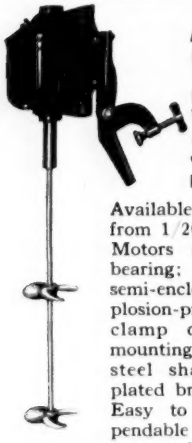

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High speed—
1725 R.P.M.
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18 REGENT STREET
East Norwalk, Conn.

apple concentrate. He reviewed the development of means for recovering fruit concentrates and improvements made in the process, discussing some of the problems in connection with their industrial applications.

Officers elected: President, John N. Culett, McCormick & Co., Baltimore, Md.; 1st Vice-President, Frank D. Nowland, George N. Nowland, Cincinnati; 2nd Vice-President, W. G. Grant, National Nu Grape Co., Atlanta; 3rd Vice-President, W. H. Hottinger, Jr., Bowey's Inc., Chicago; Secretary, Leland P. Symmes, Baker Extract Co., Springfield, Mass.; and Treasurer, Lloyd E. Smith, Virginia Dare Extract Co., Brooklyn, N. Y.

Snapped-Off Asparagus Cuts Handling Costs

Asparagus in Michigan can be snapped off rather than laboriously cut. This change in methods results in a 50 percent saving in handling, both to growers and processors, says R. L. Carolus of the department of horticulture at Michigan State College.

A four-year experiment, started by MSC horticulturist, Keith C. Barrons in 1945 and continued by Carolus, has resulted in the harvesting of one-third of Michigan's 6,000 acre asparagus crop by the snapping method. According to Carolus, processors have been able to pay from 80 to 100 percent more for snapped asparagus than for the product cut with the butts on. Yields of snapped asparagus in the four-year trials have been 60 to 65 percent of the yields when the crop was harvested by cutting. Total yields of edible asparagus have run higher in the snapped plots. Thus, income to growers has been boosted 10 to 15 percent or more and harvesting costs reduced.

Growers estimate that only 50 percent as much labor is required in harvesting by the snapping method. Canners reported that the labor required in processing snapped asparagus was 55 percent less than that required for the cut product.

Carolus stresses several precautions that must be observed in snapping. Snapped asparagus must be handled rapidly. Not more than eight hours should elapse between harvesting and processing. If the product must be hauled long distances to the cannery, snapping may not be practical. However, much of the asparagus acreage is located close to processing plants. After being snapped, asparagus should be covered with wet sacks to prevent deterioration.

In harvesting, the spears should be grasped between the thumb and forefinger and snapped by pushing away from the picker. Snapping by pulling toward the picker results in the spear breaking too low in the region of high fiber. A poor quality product results. Careful supervision of harvest labor is necessary when the snapping method is used.

PROCESSING

Canned Pimiento Study Eliminates Spoilage

Research on canned pimientos reveals no bacteriological evidence that boiling water processing is dangerous from the standpoint of public health, according to the National Canners Association. Work at the association laboratories, which was aided by other canning industry labs, showed, however, some spoilage from other types of organisms having thermal resistance sufficiently great to survive the usual boiling water processes. In these instances the spoilage was eliminated by lowering the pH of the product to 4.7 or below by acidification procedures.

The addition of both citric acid and acetic acid (in the form of vinegar) is permitted by the Food & Drug Administration. However, flavor studies on red pimientos have shown that citric acid is preferable.

The acidification studies showed that spraying or dipping blanched pimientos in an 0.5 percent solution of citric acid or acetic acid (as vinegar) for about 50 to 60 seconds prior to packing will lower the pH of the final canned product to an average value of about 4.7. Using a 1.25 percent solution of these acids will lower the pH to about 4.5. Reduction in pH can also be accomplished by direct addition of acid solutions to the canned product prior to exhausting and sealing. Completely filling the cans with a brine containing 0.75 percent acid (either citric or acetic) will lower the pH to a value in the neighborhood of 4.7.

The above-mentioned acid concentrations and dipping or spraying times are based on limited experimental data, and adjustments probably will be required in commercial application. An adequate and accurate control system is imperative if acidulation is used, because of variations in wall thickness and pH of individual pods. A research laboratory connected with the canning industry should be consulted before establishing procedures for acidulation and its control.

Conclusions from the experimental

Wide World

Pretzel Twist

Judges at the mid-year convention of the National Pretzel Bakers Institute, in Philadelphia, got all twisted trying to make a final choice. The Carlton twins were the cause of it all, so the judges took the only way. Also, if anyone's interested, the pretzel is real.

work are that it is advisable to acidify red pimientos with citric acid to below pH 4.7 as a means of preventing spoilage and improving the quality of the product, and that boiling water processes may safely be used.

Penn Candy Makers Confer at Lehigh

Price-cutting was assailed by C. R. Kroekel, president Kroekel-Cetinger, Inc., Philadelphia, at the opening of the third annual production conference of the Pennsylvania Manufacturing Confectioners' Association in cooperation with the Lehigh University Institute of Research, May 26 and 27, at Bethlehem, Pa. He maintained that the confectioners should be able to do business profitably without resorting to unfair methods.

G. R. Cowgill, professor of nutrition, Yale University, explained that candy has a poor reputation with nutritionists because too much sugar-rich candy may mean too little of other important nutrients in the diet. He urged that the industry increase its research on adding new food value such as vitamins, minerals, and protein to candy.

If the confectioner is to minimize fat bloom in chocolate candies, he must learn to favor conditions that will produce the stable form of cocoa butter crystal when chocolate is applied as a coating, pointed out N. W. Kempf, manager of research, Walter Baker Chocolate & Cocoa Div., General Foods Corp.

(Industry News Continued)

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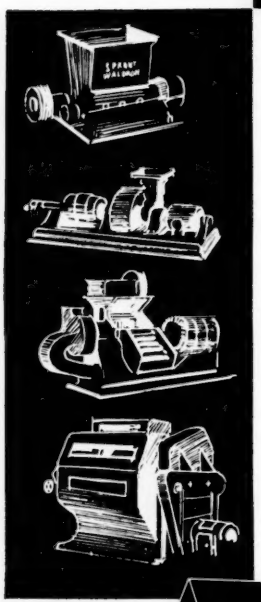
Is yours a problem of
SIZE
REDUCTION?



GRANULATING, pulverizing, defiberizing, crushing, or cutting—whatever you call it, **if it's size reduction,** Sprout-Waldron can help you.

Reduction of cocoa cake . . . corn for meal or distillers' grits . . . wheat for flour . . . citrus waste for feed—these are typical applications in which Sprout-Waldron experience and equipment have been outstanding.

Every day S-W Engineers are transforming new and varied size reduction problems into more profitable operations. Whether your processing calls for the usual or the unusual approach, first learn what Sprout-Waldron can do for you!

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Food Industry News

Eastern Publishers

Must Be a Mirage

England's children got their first look at a candy display window in April, when the candy rationing, imposed in 1939, was finally lifted. Up to this time, one small package a week was all there was. Now comes the brand new problem of selecting the most for the money.

Unfortunately, when cocoa butter is rapidly cooled, four types of crystals are produced simultaneously. Each crystal seed formed encourages the growth of more crystals of the same type in its location. For a stable product, he went on, it is necessary to remove as much latent heat as possible and create a majority of the stable form of seed, destroying, if possible, the unstable crystal form. The rate of heat removal is the most important factor in determining the type of crystal formed. A slow rate, accompanied by moderate agitation, favors the formation of the stable crystal.

Having established a sufficient number of stable seed crystals, the next step is to apply the chocolate to centers without destroying the seed and then solidify the chocolate in its new position. If uniform results are to be obtained during the chocolate enrobing operation, the temperature of the centers must be held at about 75 deg. F.

He advised designing the cooling tunnel so air flows countercurrent to the movement of the chocolate coated centers. Thus, the lowest temperature differential is provided at the entering section and the rate of heat removal is less as the chocolates enter the tunnel but is increased as they pass through it. Actual temperatures used are determined by the length of the tunnel, speed of the conveyor belt, and amount of chocolate passing through the tunnel in a unit time.

Problems in candy technology presently being investigated at Lehigh Uni-

versity under the sponsorship of the Pennsylvania Manufacturing Confectioners' Association were cited by H. A. Neville, director, Institute of Research, Lehigh University, to be:

1. Nature, cause, and prevention of graying or fat bloom in chocolate candies.

The cause of chocolate bloom has been determined with reasonable certainty. It is attributed to the segregation and crystallization of the higher melting fractions of the cocoa butter. The migration of this compound to the surface occurs readily at higher temperatures through the medium of liquid fats and crystallization of solid fat that results upon cooling.

The correction of fat bloom has been attempted in several ways.

2. Prevention of stickiness and graining or crystallization of hard candies.

The prevention of these conditions has been attempted by using surface coatings to reduce or prevent moisture absorption by the sugar when it is in a glassy state. Agents also have been included in the mix to stabilize a higher moisture content of the candy and thus decrease the tendency of the candy to absorb additional moisture from the atmosphere.

3. Elimination of the development of stickiness and graining in marshmallows.

This study has only been initiated. And it is hoped to improve this condition in marshmallows by the use of suitable additives or better control of manufacturing conditions.

4. Prevention of moisture loss and mottling in bonbon coatings.

Investigations are underway to study what effect the addition of hydrophilic agents may have in restoring the proper moisture content of bonbon coatings.

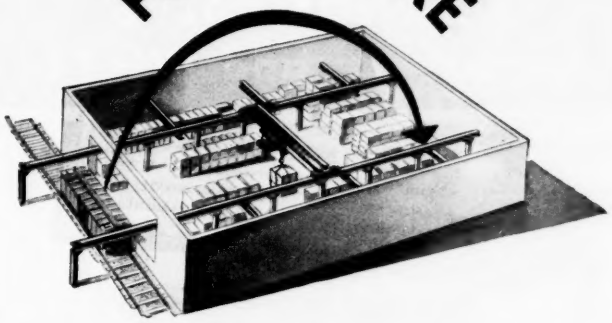
Improved Food Processing Noted In F&DA Report

The annual report of the Food & Drug Administration for 1948 marks a decade of enforcement of the Food, Drug & Cosmetic Act of 1938. Summarizing its activities in food processing, the report states:

"The fiscal year 1948 shows improved conditions in almost every major food industry. Many steps have been taken on an industry-wide basis to bring about voluntary corrections of unsanitary conditions in factories. Experts have been employed by industry associations and by individual manufacturers, and constructive sanitation programs have been put into effect. Without such efforts it would be necessary to institute many more legal actions to achieve compliance."

(Industry News Continued)

PUT IT THERE



Faster, Cheaper and With Greater Safety

THROUGH THE AIR

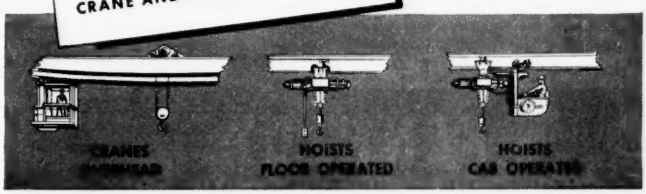
A quick hook-on to a pallet, basket or standard sling and the load is whisked away—cutting across occupied floor space—straight to the spot where you want it.

It's smart, and thrifty to use "through the air" transportation as widely as you can in plants and warehouses. Compare this method for overall cost, efficiency, maintenance and safety before you allow other means of transfer to overlap the service that is best performed by cranes and hoists!

Let the Shepard Niles specialist break your problem down for you—he's experienced, skillful and he has the maximum number of sizes and types in his product line.

SHEPARD NILES
CRANE AND HOIST CORPORATION

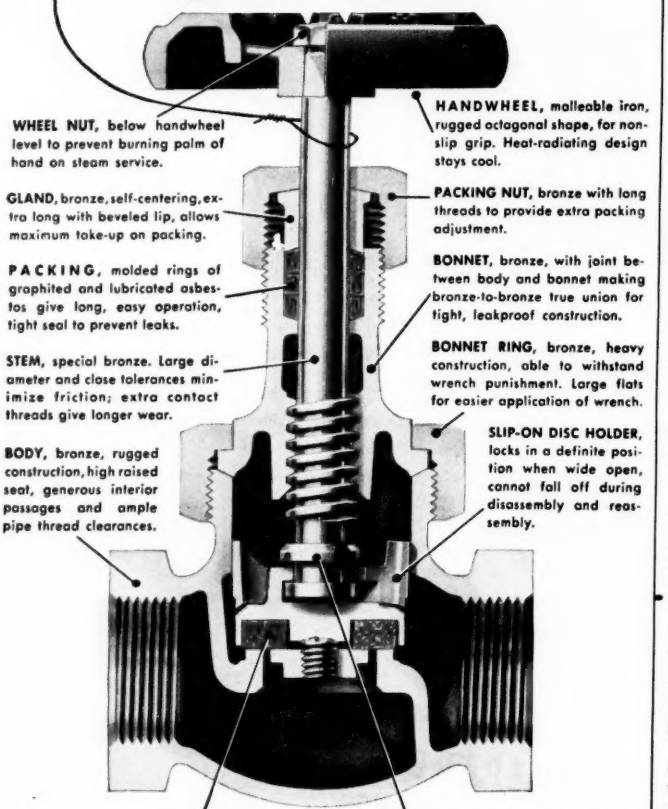
Makes and sells all three lifting tools for airborne shop loads.



422 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

Here's WHAT makes this KENNEDY VALVE Better . . . . and WHY!

KENNEDY HEAVY BRONZE GLOBE VALVE (FIG. 89) recommended for services up to 150 pounds steam or 250 pounds water, oil, air or gas. ¼" to 3" sizes available.



WHEEL NUT, below handwheel level to prevent burning palm of hand on steam service.

HANDWHEEL, malleable iron, rugged octagonal shape, for non-slip grip. Heat-radiating design stays cool.

GLAND, bronze, self-centering, extra long with beveled lip, allows maximum take-up on packing.

PACKING NUT, bronze with long threads to provide extra packing adjustment.

PACKING, molded rings of graphited and lubricated asbestos give long, easy operation, tight seal to prevent leaks.

BONNET, bronze, with joint between body and bonnet making bronze-to-bronze true union for tight, leakproof construction.

STEM, special bronze. Large diameter and close tolerances minimize friction; extra contact threads give longer wear.

BONNET RING, bronze, heavy construction, able to withstand wrench punishment. Large flats for easier application of wrench.

SLIP-ON DISC HOLDER, locks in a definite position when wide open, cannot fall off during disassembly and reassembly.

BODY, bronze, rugged construction, high raised seat, generous interior passages and ample pipe thread clearances.

RENEWABLE COMPOSITION DISC, provides perfect seating; asbestos for steam service and special types for various services and temperatures.

BEVELED SHOULDER, makes tight joint with conical seat on underside of bonnet when valve is wide open, for repacking under pressure.

Write for Bulletin No. 36 • **BUY FROM YOUR LOCAL DISTRIBUTOR**

THE **KENNEDY** VALVE MFG. CO.
1065 EAST WATER ST.
ELMIRA, NEW YORK

VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE-WAREHOUSES IN NEW YORK, CHICAGO, SAN FRANCISCO • SALES REPRESENTATIVES IN PRINCIPAL CITIES

Food & Drug officials then note:

"On the whole, the court actions . . . were brought against the fringe of manufacturers and handlers of food who violated the law deliberately or through gross negligence." And, "the courts have shown increasing severity in imposing penalties upon those convicted of violations."

About two-thirds of Food & Drug's enforcement activities are directed toward the food processors.

Tables presented in the annual report show that 67.1 percent of enforcement time is spent on food, and that 11,075 interstate food samples were collected or inspected. This compares with a total of 17,264 collections or inspections for all products under Food & Drug jurisdiction.

Protection of American food processors against sub-standard imported products stacks up as a major activity of the federal agency. More than twice as many sample inspections were made of imported foods (25,078), as were made of domestic interstate shipments. The percentage of food imports detained at U. S. ports, in almost every commodity, runs many times higher than the actions taken against U. S. products.

Compared with the vast number of processors that make up the U. S. food industry, Food & Drug figures on enforcement activities are remarkably low.

Rice Growers Cooperative Extracts Oil From Bran

American Rice Growers Cooperative Association has put into operation at its mill at Houston the first commercial plant for the continuous solvent extraction of oil from rice bran. Based on pilot plant work performed at Danville, Ill., by Allis-Chalmers Manufacturing Co. under arrangement with the association, which had previously done laboratory work at Houston, the new plant is designed to process 50 tons of bran per 24 hr. and extract therefrom 9 tons of oil.

The process, which uses hexane as the solvent, is substantially similar to the commercial extraction plants that Allis-Chalmers has installed elsewhere to process cottonseed and soybeans.

Brewing Research

Research with a practical accent keynotes the recently-released Eighth Annual Edition of "A National Survey of the Brewing Industry", prepared by the Research Company of America in N. Y. This survey, the first released since 1944 when war conditions pre-

Wide World

New Fashioned Sausage

Developed under the direction of American food officials, ersatz meat is filled into sausage-type sacks at a Western Germany plant. Composed of defatted soya, food yeast, fat, hydrolyzed proteins, cereals, spices and regular sausage meat, the ersatz tastes genuine, but costs about half

---

vented issuance, contains detailed analyses of various economic and marketing factors affecting the production, distribution and consumption of beer in this country, with supporting statistical data. The survey also contains individual production figures for all United States breweries and financial statistics for the leading United States brewers.

McGRAW-HILL *World News*

New Confectionery Plant Slated in Puerto Rico

SAN JUAN, P. R.—Casa Motta, one of the largest confectionery establishments of Italy, will establish a factory in Puerto Rico, at a new building that will occupy 20,000 sq. ft., with facilities for expansion to 200,000 ft. The new plant will manufacture caramels, chocolates, hard candy, candied fruits and others, all for export.

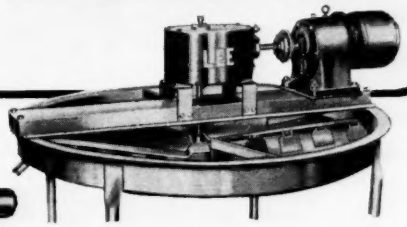
Following negotiations with the Puerto Rico Industrial Development Co., Dr. Alberto Ferrante, general manager of Sociedad Italiana Motta, and Ricardo Manfrin, Alfredo Beltrani and Enrique Guarioni visited the Island recently.

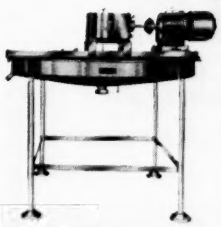
The plant will have modern equip-

(Industry News Continued)

THE NEW LEE Preserve Cooling Pans

COOLS 60 GALLONS FROM BOILING TO 180° F IN FIVE MINUTES





Made of stainless steel, these new LEE Cooling Pans are designed to reduce the cooling cycle from hours to minutes. Meet or exceed the rigid sanitary requirements set up by most local or state authorities.

Write for Bulletin LM-14 today.

LEE METAL PRODUCTS CO., INC.
416 PINE STREET, PHILIPSBURG, PA.
ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

Case History No. [illegible]

THE ..... Company has introduced a new high quality food item—requiring meticulous handling in its various stages of packaging assembly.

The package contains two units of prepared mixes—the necessary elements for the completed product.

A spotless plant—top supervision—and efficient but flexible production are the routine benefits accruing to this Company through its contract with The Edlaw Company.

Now past the "growing-pains" stage, this newcomer takes a place on the impressive list of "Packaging By Edlaw".

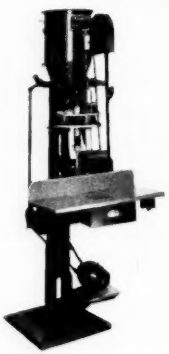
[illegible] CONTRACT PACKAGING AT [illegible]

THE EDLAW CO.
88–61 76th Ave., Glendale 27, N. Y.
Kindly contact our
MR. .....
COMPANY .....
.....

Modern Triangle Package Machinery Will Relieve the Pressure

THERE IS more than one manufacturer having a tight squeeze. Perhaps he, like 3 out of 4, has overlooked the opportunity for modernizing an antiquated packaging department that is robbing him of profits. Triangle owners regularly report savings of 25% and more in packaging costs.

FOR EXAMPLE: The simple Triangle Model SPA Volumetric Filler illustrated is credited with $60 per month labor saving for a dessert manufacturer. Fast and accurate, this one-operator machine will accurately fill packages with semi-free and free flowing material at a rate up to 60 per minute. Filling and discharging is fully automatic. For high speed, fully automatic production it is available in multiple units with synchronized conveyors. This is one of many Triangle machines for weighing, filling or carton sealing of dry materials.



Write for literature and ASK ABOUT THE TRIANGLE PAY-AS-YOU-PACKAGE PLAN. For complete recommendations, send a sample filled package and state production requirements . . . we'll do the rest . . . no obligation.

TRIANGLE PACKAGE MACHINERY CO.

6638 W. DIVERSEY BLVD., CHICAGO 35, ILL.

Sales Offices: San Francisco, Denver, Dallas, Atlanta, New York, Pittsburgh, Boston, Jacksonville. *Branch Factory:* Los Angeles.

Wide World

Research Honors

For developing a whipping agent from soybeans and discovering a vegetable protein gel, Mrs. Letta I. Devoss, an employee of the Northern Regional Research Laboratory, receives a Superior Service Award from Secretary of Agriculture Brannan, during an award ceremony at Washington, in May.

ment installed and will use raw materials produced on the Island, such as sugar, paper bags, etc. Casa Motta is the first Italian manufacturing firm to be established on the Island since the tax holiday act became effective and the Aid-to-Industry program was set up. Plans for the construction of the confectionery factory have already been prepared.

Argentine Fruit Exports Short on Returns

BUENOS AIRES—As far as Argentine exporters are concerned, the returns to date on Argentina's renewed fruit shipments to the U. S. have been discouraging.

Following the marketing of ten cargoes in New York and New Orleans since early March—totaling around 5,000 tons of Argentine pears, grapes, apples and plums—the fruit export company, K. O. Kleppe y Cía., in Buenos Aires, revealed that its U. S. representatives had little more than broken even.

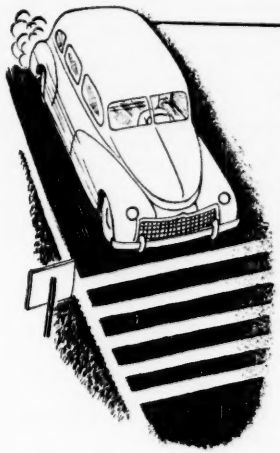
"Returns so far have not been enough to warrant continuing the trade," said a Kleppe official here. He added, however, that shipments would continue for another month in hopes of obtaining slightly higher prices. Within that time, Argentina's peak fruit season shall have ended.

Dealers say the high costs entailed

(Industry News Continued)

Good, Better, Best

—which is which by Test!



The Hit-the-Road Test

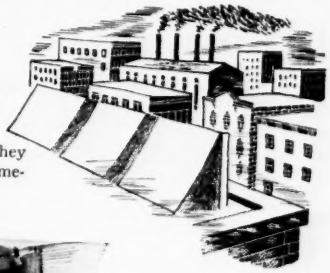
It's a good sign to drive along a turnpike and see a series of white stripes painted across the road. It means the state is on the job. Its public officials are testing the endurance of different paints to determine the best for marking traffic lanes.

The Half-a-Head Test

It's a horrible way to treat a poor innocent girl. But it's big business . . . *important* business. To compare the effectiveness of different shampoos they split a girl's head in halves (figuratively, of course) and do one side with one shampoo, the other side with another.

The Hoboken Test

One of the most prominent laboratories in America tested dyed fabrics by hanging them *for one year* on a roof in Hoboken, N. J. We wondered why they picked Hoboken. They said there was something in the air.



The Dollars-and-Sense Test

It takes good common sense to save important dollars on industrial painting jobs. That is why it's wise to test paints before final specification. After all, it isn't the cost per gallon that counts. It's the *amount* of paint required and the *time and labor* involved that govern the cost of the job. So test. Compare. Yes, compare *by performance* a gallon of any other good paint with a gallon of Barreled Sunlight. See how much more yardage Barreled Sunlight gives you. Clock how much faster Barreled Sunlight goes on. Notice how much whiter, cleaner, more solid Barreled Sunlight looks after drying. You'll be convinced, once and for all, that Barreled Sunlight is the paint that makes sense and saves dollars. It tops any other paint on the market.

Want proof? Write, and a Barreled Sunlight representative will call on you soon.

U. S. GUTTA PERCHA PAINT COMPANY
37-G Dudley Street, Providence, Rhode Island

Barreled Sunlight *Paints*

In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job

CUT PACKAGING COSTS!

use FINDLEY service-tested ADHESIVES

MORE FOR LESS!

✓Producing more for less through cutting costs by maintaining peak production, is the big job facing every manufacturer today. Faster, trouble-free production and better, more attractive products and packages spell P-R-O-F-I-T-S. Because every Findley Adhesive gives you these things, you get more for less.

DOUBLE VALUE!

✓Every Findley Adhesive carries a double barreled load! First, they assure faster trouble-free production, greater mileage, less down time for handling and clean up, and fewer rejects. Second, they produce safer, more attractive packages . . . packages strong in shelf appeal . . . packages that spell freedom from damage claims.

FOR EVERY PACKAGING APPLICATION

✓There's a Findley Service-Tested Adhesive for every packaging, labeling and converting need . . . for every stock and finish . . . to work on all types of equipment.

PERFORMANCE INSURANCE!

✓ For over 45 years leading manufacturers have banked on Findley service and experience to help them cut costs. The entire Findley organization is at your service to help you cut costs. Call . . . wire or write.

plants at MILWAUKEE AND HOUSTON

sales offices in CHICAGO, KANSAS CITY, NEW ORLEANS, DALLAS, HOUSTON, MINNEAPOLIS, KALAMAZOO, LOUISVILLE, AND OGDEN, UTAH

Findley's INDUSTRIAL ADHESIVES exclusively

THE F. G. FINDLEY COMPANY • 3059 W. PEMBERTON AVENUE • MILWAUKEE 10, WIS.

in satisfying U. S. sanitary regulations make the shipments unprofitable, despite top prices for Argentine fruit in New York—as high as $8.20 per 50-lb. crate of Williams pears and $5.50 per crate for grapes.

New Coffee Record

RIO DE JANEIRO—Brazilian coffee exports reached 17,192,324 bags in 1948, a new record, and represented about 42 percent of the country's sales abroad. The coffee exports brought over 9 billion cruzeiros (about $450 million) f.o.b. Brazil of the country's total sales abroad of about 21.7 billion cruzeiros (about $1,285 million).

As usual, the United States took the biggest share of Brazil's coffee—11,726,331 bags, according to official Brazilian statistics. Europe bought 3,300,000 bags, and other South American countries nearly 1,000,000.

Trade for Grain

BOMBAY—A third trade agreement which will raise to 350,000 metric tons the total Indian imports of grain from Russia since last July is being negotiated. In exchange for 200,000 metric tons of Soviet wheat and 20,000 metric tons of Soviet corn, India is prepared to ship 20,000 metric tons of raw jute and 7,000 metric tons of tea.

Schedule of Events

July

11-14—Institute of Food Technologists, 9th annual meeting, Civic Auditorium, San Francisco.

August

9-12—Western Packaging Exposition, 2nd annual conference and exposition on packaging, packing and shipping, Civic Auditorium, San Francisco.

15-19—International Dairy Federation and Swedish Dairy Industry, 12th International Dairy Congress, House of Parliament and Concert Hall, Stockholm, Sweden.

15-19—American Oil Chemists Society-University of Illinois, edible fats and oils short course, Urbana, Ill.

17-Sept. 6—United Nations, scientific conference on the conservation and utilization of resources.
—August 18—Critical food shortages.
—Sept. 2—Development of fish resources and processing—Lake Success, N. Y.

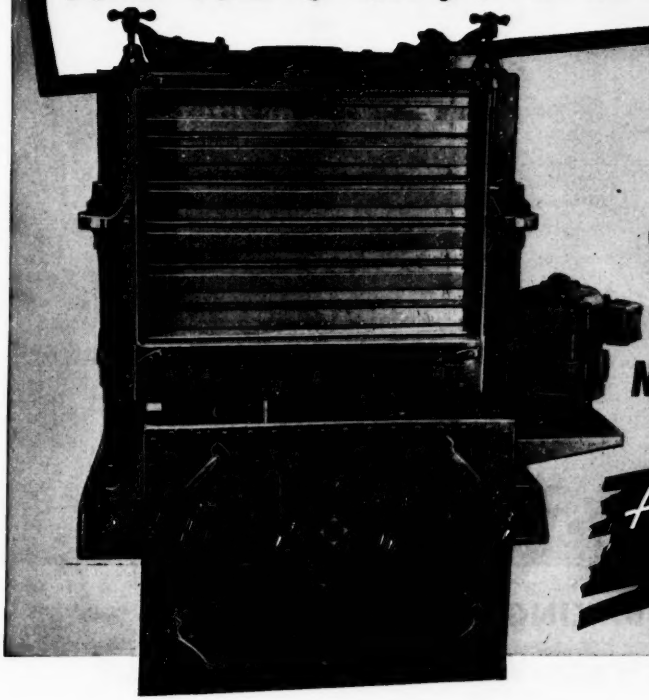
28-31—National Frozen Food Locker Assn., 10th annual meeting, Stevens Hotel, Chicago.

September

8-9—Cornell University, dairy industry conference, Ithaca, N. Y.

—*End*

It's NEW and it's SANITARY!



ALLIS-CHALMERS *ALL-METAL* GYRATORY SIFTER WITH EASY-TO-CLEAN MAGNESIUM SIEVES

Available Now for Quick Delivery

HERE'S the *newest* in sanitary Low-Head sifters! It's the Allis-Chalmers all-metal gyratory sifter —specially designed to give you improved sanitation in the grading and resifting operations in your food processing plant.

METAL CONSTRUCTION

The new Allis-Chalmers unit is of *all-metal* construction, light in weight but built strong for long, dependable operating life. All riveted joints are gasket-sealed to prevent leakage of fine materials. And—because the machine is made entirely of metal—there is no chance for cracks or crevices to develop.

HIGH SPEED UNIT

This *Low-Head* sifter is a high speed, high capacity unit. Each sifter holds 4 to 7 sieves . . . and is powered by a 1 hp explosion-proof Allis-Chalmers motor with quiet-running *Texrope* Drive. This sifter can handle high-temperature materials because there are *no* wooden parts.

EASY TO CLEAN

The all-metal sifter can be easily cleaned for quick product-handling changeover. All parts of the sifter can be *safely washed*. It's engineered and built for smooth performance, low maintenance. And it's available *now* for quick delivery!

Texrope and Low-Head are Allis-Chalmers trademarks.

Send coupon below for handy information packet with details on this new all-metal sifter and a copy of bulletin 06B6124A on the standard Low-Head sifter.

A 2617

ALLIS-CHALMERS, 1113A SO. 70 ST.
MILWAUKEE, WIS.

☐ Please send handy packet with information on new All-Metal sifter and standard sifter bulletin 06B6124A.

☐ Would like personal visit from A-C representative with details of new sifter.

Name

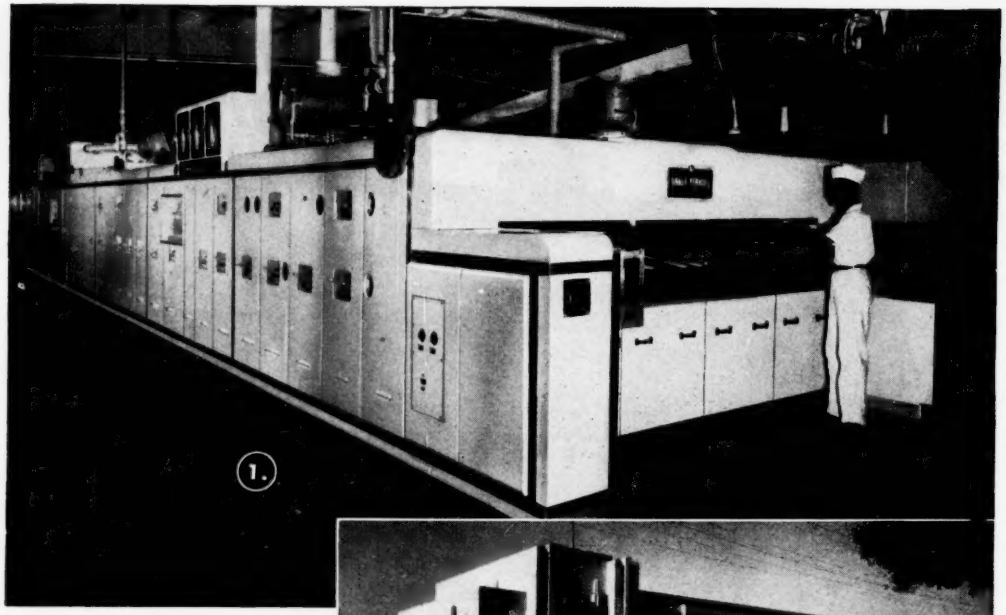
Company

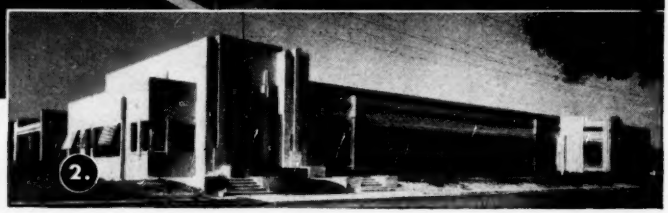
Street

City State

ALLIS-CHALMERS

Serving the Food Industry for 102 Years

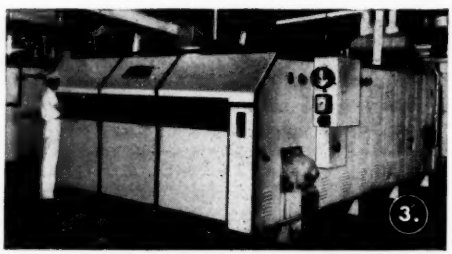




Varied Baking Operations at HOLSUM BAKING COMPANY Demonstrate Versatility of GAS

TEMPERATURE CONTROL headed the list of fuel requirements cited by President William L. Trammell in discussing baking operations at Holsum Baking Company, Harlingen, Texas. Continuing, Mr. Trammell stated, "**GAS is the ideal fuel for our needs because it can be automatically controlled to provide exactly the temperature for our products. And, GAS meets all our demands for cleanliness, flexibility, and economy.**"

In this modern plant gas-fired ovens keep pace with the growing needs for baked goods in the Lower Rio Grande Valley. Operations requiring steam are supplied from Gas-fired boilers, while a Gas water heater provides adequate quantities of water at proper temperatures for sanitation and sterilization of equipment.



1. Continuous Gas-fired travelling oven with a capacity of 3000# per hour.

2. Modern plant of Holsum Baking Company, Harlingen, Texas.

3. Gas-fired tray oven with 1500# hourly capacity.

This modern bakery, employing streamlined methods, utilizes GAS for every heat processing requirement because Gas Equipment fits right into the production-line. It's a typical example of the manner in which progressive commercial bakers profit by the effective utilization of GAS.

The results achieved by Holsum Baking Company, in adopting modern Gas Equipment for all baking operations, may be important in your production-planning. They're worth investigating.

MORE AND MORE... THE TREND IS TO GAS FOR ALL COMMERCIAL BAKING

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N.Y.

Changes in Food Supplies

PRODUCTION OF FROZEN FRUITS

(In thousands of pounds)

Product	1946	1947	1948
Apples and applesauce	78,220	28,573	27,552
Apricots	43,571	6,007	2,477
Blackberries	19,570	14,510	9,745
Black raspberries	5,516	7,116	4,519
Blueberries	10,240	5,407	7,661
Boysenberries	10,905	12,495	8,832
Cherries, R.S.P.	88,061	67,002	87,798
Cherries, sweet	7,831	357	664
Currants	4,219	4,089	3,880
Gooseberries	1,430	93	44
Grapes and pulp	12,445	20,975	5,511
Loganberries	3,017	2,299	4,174
Peaches	65,140	27,034	13,598
Pineapple	23,006	5,909	3,677
Prunes	14,106	2,843	2,125
Red raspberries	23,905	25,401	23,198
Strawberries	78,059	109,036	160,077
Youngberries	1,766	1,161	663
Other fruits and berries	32,093	6,946	*11,464
Total	523,281	347,251	377,660

• Other fruits and berries include bananas, cantaloupe, citrus peel, elderberries, grapefruit sections and juice, lemon juice, mixed fruit, orange juice (single strength only), pears, plums and watermelon.

PRODUCTION OF FROZEN VEGETABLES

(In thousands of pounds)

Product	1946	1947	1948
Asparagus	28,316	10,737	18,321
Beans, green and wax	40,975	30,911	49,583
Beans, lima	50,083	67,578	75,403
Broccoli	25,789	*9,117	29,126
Brussels sprouts	13,521	*4,557	10,526
Carrots	9,069	2,905	15,393
Cauliflower	13,237	*5,353	13,963
Corn, cut	42,427	26,559	20,920
Corn, on cob	2,296	6,064	10,324
Peas, green	140,603	131,786	118,977
Peas and carrots	7,186	5,302	6,510
Pumpkin & squash	10,009	5,190	5,577
Rhubarb	10,566	1,538	2,629
Spinach	38,185	23,279	41,571
Succotash	3,410	3,763	6,879
Misc. vegetables	14,329	10,953	†20,656
Total	450,000	*345,591	446,358

• Revised. † Includes mixed vegetables, French fried potatoes, peppers, okra, collard greens, turnip greens, other greens and blackeye peas.

(Compiled by National Association of Frozen Food Packers)

Production

CREAMERY BUTTER output, estimated at 124,190,000 lb., in April, was 11 percent above March production—the same as last year's March-April increase—and was 2 percent above the five-year average. Production, moreover, was 24 percent above last year's output for the month and was 1 percent over the 1943–47 April average.

ICE CREAM production was estimated at 44,890,000 gal., in April, 11 percent below April output last year, and only 4 percent larger than the five-year average for the month. The March-April increase was only 7 percent, compared with 11 percent a year ago and a five-year average of 21 percent.

CANNED SPINACH packed in 1948 amounted to 4,989,290 cases, on a 24/2's basis, compared with 3,908,951 cases packed in 1947. In addition, actual case packs of turnip greens amounted to 868,225 cases; mustard greens, 451,752, and other greens, 212,513 cases.

CANNED CRANBERRY SAUCE packed in the 1948–49 season amounted to 2,397,162 actual cases, a decline of 40 percent under the previous year's pack of 4,007,348 cases.

CANNED WHITE POTATOES packed in 1948 showed an increase of 77 percent over last year. Actual cases packed totaled 1,558,822, compared with 882,566 cases turned out in 1947.

CANNED SWEET POTATOES totaled 1,470,109 actual cases in 1948, approximately 6 percent more than the 1947 pack of 1,380,830 cases.

Storage

FROZEN FISH AND SHELLFISH held in storage May 1, totaled 75,106,752, compared with 83,632,069 lb. held on April 1, and 68,267,629 lb. in storage May 1, 1948.

PUBLIC COOLER occupancy was down to 49 percent on May 1, compared with 62 percent at the same time last year, and a five-year average of 70 percent.

PUBLIC FREEZER occupancy on May 1, was 60 percent, 10 points below the level reported on May 1, 1948, and 14 points under the five-year average occupancy for the date.

CONSTRUCTION

	Pending (thousands)	Total Awarded- June (thousands)	1949 (thousands)
Bakery	$800	.....	$2,775
Beverages	2,000	$1,468	9,554
Canning and Preserving	.....	.....	115
Cold Storage	.....	68	1,745
Confectionery	.....	.....	700
Grain Mill Products	1,835	1,278	6,421
Ice, Manufactured	.....	.....	.....
Meats and Meat Products	80	68	6,864
Milk Products	338	136	1,961
Miscellaneous	2,450	341	8,913
	$7,503	$3,359	$39,048

Low Cost Fortifiers Help Meet Tougher Competition!

ONE added low cost nutritional fortifier can spark advertising and sales... provide fresh appeals to consumers... put you far ahead of your competitors!

One of our technical men will be pleased to consult with you. No obligation! Special Products Division, STANDARD BRANDS INCORPORATED, New York 22, N. Y.

VITAMIN D PRODUCTS: Hy-Dee Irradiated Dry Yeast, Irradiated Dry Yeast Type 700-H, Viosterol (Irradiated Ergosterol).

NATURAL B-COMPLEX PRODUCTS: Pure Primary Dry Yeast (brewers' type), Bee-Flex Products, Yeast Extracts, Yeast Extract and Liver, Fortified Yeast with Iron.

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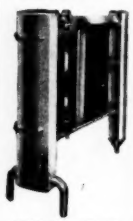
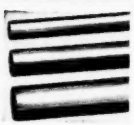
CP Multi-Flo Homogenizer with Single Service Valve does a better job of homogenization with less pressure and horsepower. Minimum clean-up time.



CP Stainless Steel Multi-Pass Plate Heat Exchanger. Can be used for heating or cooling milk and many other liquid products, or as a High Temperature Short Time Pasteurizer.

CP Stainless Steel Multi-Process Tanks are ideal for pasteurizing and mixing milk, cream, and other liquid food products. Vapor or Film Heating.

CP Stainless Steel Pumps assure sanitation standards. Ideal for pumping a wide variety of liquid food products.



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See Classified Directory for Phone Number of the nearest CP Branch listed below.

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CREAMERY PACKAGE MFG. CO. OF CANADA, LTD. — TORONTO

What Washington Thinks

By R. S. McBride, Washington, D. C.

GOOD JUDGMENT — Comparison has been made of the relation between taste panel preferences and the chemical changes occurring in oranges during ripening. Preference of the taste panel as to the ripeness of the fruit when picked, as judged by the enjoyment of the juice, agreed almost exactly with the time at which the juice had highest dietetic value in vitamin content and in ratio of carbohydrates to acid. Evidently, it was intended that man should eat the juice at just this point when protective vitamin values are highest. One must assume that Nature is rather clever in her plans.

SPRING CLOTHESPINS—Many of the trade agreements with other nations provide an escape clause under which cuts in U. S. tariff rates may be withdrawn if investigation proves that imports or prospective imports threaten undue hardship to United States industry interested in that commodity. Numerous requests have been made to the U. S. Tariff Commission for investigations, on the ground that such threat exists. All of these have been dismissed by the Commission, except one on spring clothespins. Obviously, the escape clause does not provide any practical protection for important food commodities.

"LIKE A FACTORY"—In the case of poultry, food processing has moved back on the farm to a very considerable extent. Recently, the Department of Agriculture described the turkey business of one Kentucky grower by saying that his "farmstead actually looks more like a factory than a farm." Among other facilities, this "farm" has an electric cooler that can handle up to 100,000 lb. of turkey meat at one time. It includes a precooling room and frozen storage of the most modern sort. Other facilities provide for cooling, dressing, and processing in various ways, including hot wax dipping of the dressed birds to seal against dehydration. A good many so-called "factories" do not have equipment of equal capacity and modern form. Perhaps food technologists will have to begin to look for their jobs in the country.

MORE WHOLE MILK—Farmers are finding substantially greater markets for whole milk than formerly. Larger demand for dried skim milk, which has increased substantially during the past 15 years, accounts for this. Nearly a quarter of the butter now made is produced from milk separated at the creamery, a practice that was negligible in importance 15 or 20 years ago. Modified dairy plant layouts are necessary to meet this change in marketing habit.

DEXTROSE GAINS—Use of sucrose last year and this is about 95 or 96 percent of prewar. This does not mean that there is less sweetener used. Much of the deficit has been made up by replacement with corn syrup and corn sugar. Last year's consumption totals for these two sweeteners were 132 percent and 167 percent, respectively, of the prewar average. Major cause is, of course, restriction on supply and resulting high price of sugar.

"NOT INCOMPATIBLE" — Recently, one of the top executives of FAO, in publicizing need for better world food distribution, presented from a new angle a problem of the food industries. He said: "Executive management can (now) more fairly evaluate mechanical functioning together with the nutritional needs of an eating public."

Perhaps some technologists need to sell this idea to those top executives who fail to coordinate the problems of mechanical plant efficiency with the basic responsibility of delivering processed foods of highest nutritional value. Incidentally, a careful analysis of this problem is bound to disclose a few cases where excessive processing, as of rice, does create new problems through elimination of essential nutrients of both vitamin and mineral types.

DANGEROUS ECONOMY—To save negative calories, certain flaked ice equipment collects melted ice below storage compartments and reuses the water. Inspectors of the Bureau of Animal Industry have recently made field investigations of this practice and definitely proved that this economy generally causes pollution of the ice. Inspectors in charge at Federally inspected meat product plants are instructed to forbid this recycling of water drip into the ice system. But the practical economy of saving the negative calories is taken into account in the official order, which says: "There is no objection, of course, to prechilling the

water intended for the manufacture of ice by circulating it in closed coils submerged in the cold water beneath the storage compartment."

"HIDDEN PAYROLL"—Chamber of Commerce of U. S. has recently surveyed labor costs for items that are not a part of direct weekly payrolls. This study demonstrates that about 90 percent of all companies pay out about 10 percent or more of the direct payroll in extra non-wage costs for labor. This ratio of indirect or "hidden payroll" items is one of growing importance this year when wage negotiators are quite generally recognizing the undesirability of a fourth round of direct wage increases.

Plant operators as well as top executives in the food business can usefully study the Chamber report on this subject. It identifies, for the food companies investigated, costs averaging 17.5c. per hour worked in the form of non-wage payments in food, beverage, and tobacco plants. Since this amounts to more than 14 percent of the direct payroll, it is a cost item of substantial importance.

MVA AND FOOD—Elaborate studies and reports are being made in Washington as a preliminary to pushing, next year, the legislation for a Missouri Valley Authority. Outstanding material has just been released by Secretary of Agriculture Branman in an "Agricultural Program" for the Missouri River Basin. Food production and processing in the area is obviously contemplated as a major part.

Estimated costs of this farm plan for the first 30 years would exceed $3,000,000,000 if the Branman concept were followed. This says nothing about water resources, flood control, power or navigation facilities, and the like. Certainly, no action will be taken by Congress this year on any phase of the program. But it is going to be a pressing matter of importance to all the food industries next year.

FREIGHT BILLS—Inter-city transportation of farm food products now costs more than $2,000,000,000 per year. This represents an increase in railroad and truck hire of more than 100 percent since 1940. This rise has been divided about equally between railroad freight bills and in increased costs for trucking. Any program of goods movement by the food processing industries that does not analyze these transportation costs is missing one of the major new factors of delivered costs.

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LUBRIPLATE 130-AA

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A super grease-type lubricant! A marvelous anti-seize compound and a real protector against rust and corrosion. From the standpoint of general utility and diversity of important uses, LUBRIPLATE 130-AA is unequalled. While it is ideal for the heaviest loads, this remarkable lubricant does not cause drag and actually conserves power. Write for a free copy of the LUBRIPLATE Service Hand Book.

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for coarse and medium reduction (1" to 20 mesh). Open door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.

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for coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

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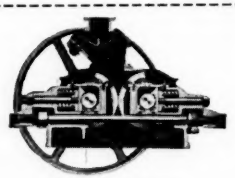
for medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.

MOTO-VIBRO SCREENS

screen anything screenable. Classified vibrations. Unit construction — any capacity. Open door accessibility. Open and closed models with or without feeders. Many types and sizes — range of work ½ inch to 60 mesh.



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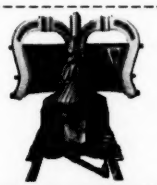
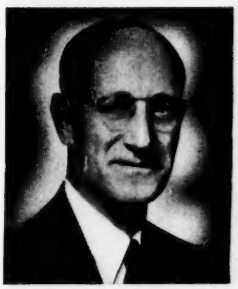
for granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8x5 to 38x20. The standard for abrasives.



ROTARY FINE CRUSHERS

for intermediate and fine reduction (1" to ¼"). Open door accessibility. Soft or moderately hard materials. Efficient granulators. Excellent preliminary Crushers preceding Pulverizers.

Men, Jobs, Companies



CLARENCE FRANCIS, board chairman of General Foods Corp., was named chairman of industrial advisory committee to guide U.S. Treasury Department's Opportunity Bond Drive.

J. DUDLEY CALHOUN has been elected vice-president of Arnold Bakers, Inc., Port Chester, N. Y. He joined firm in 1946 and has served as assistant vice-president and assistant to president.

WILLIAM H. GAMBLE, newly elected director of Corn Products Refining Co., is also president of firm's sales company. He succeeds Frank H. Hall, who resigned after 34 years as director.

MRS. MARY B. NORTON, bacteriologist heading National Dairy Products Corp.'s Sealtest consumer service, has been elected to board of directors of Sheffield Farms Co., Inc., N. Y. C.

Industry

American Spice Trade Assn. reports the election of the following officers: President, Lester W. Jones, McCormick & Co., Baltimore; vice-president, H. J. Schlicting, B. H. Old & Co., New York; treasurer, R. F. Sayia, A. A. Sayia & Co., New York; and executive secretary, E. H. Winter.

American Sugar Refining Co. has completed construction of a modern wharf at its Chalmette plant, New Orleans, to replace $2,000,000 wooden structure destroyed by fire Nov. 11, 1946.

Benner Tea Co., Burlington, Ia., celebrated its golden anniversary with opening of a modern warehouse which has floor space equivalent to five acres.

Besco Products Co., Zebulon, Ga. is building a new plant for packing fruits and vegetables.

Blevins Popcorn Co. is reported establishing a popcorn processing plant at Hazel, Ky.

The Borden Co. announces following personnel appointments: E. J. Brennan as president of Dairy Sealed operations, Ozone Park, N. Y.; W. Frank Jones as president of Borden Co., Ltd., Toronto, Canada; and Milburn McClelland as president of firm's Chicago ice cream division.

Burkhardt Brewing Co., Akron, Ohio, reports that expansion and modernization program begun two and a half years ago is nearing completion.

Canadian Sugar Factories, Ltd. is building a $5,000,000 plant at Taber, Alta., Canada.

Canada Dry Ginger Ale, Inc., reports acquiring five new franchise bottlers located in the following cities: Asheville, N. C.; Fort Worth, Tex.; Okmulgee, Okla.; Augusta, Ga.; and Baltimore, Md. The firm now has a total of 96 franchise plants working under full license in the U. S.

The Richard Colgin Co., Dallas, Tex., manufacturer of meat-curing products, has moved into a new 15,000 sq. ft. building which replaces plant recently destroyed by fire.

The Coconut Products Inc. has completed building of a modern coconut desiccating mill at Lopez, Luzon, Philippines.

Canned Pea Association has elected following officers to serve for coming year: President, R. D. Baker, Baker Canning Co., Theresa, Wis.; vice-president, C. E. Cootes, B. F. Shriver Co., Westminister, Md.; treasurer, Alex Meyer, Fredonia Canned Foods, Inc., Fredonia, Wis.

Catelli Food Products, Ltd., has completed a $300,000 plant in Lethbridge, Canada, for production of macaroni products.

Cream of Wheat Corp. is constructing a $500,000 plant in St. Boniface, Manitoba, Canada.

Knouse Foods Cooperative, Inc., Peach Glen, Pa. has recently been formed with authorized capital stock of $3,000,000. The co-op comprises over 300 leading fruit growers in the Cumberland-Appalachian belt.

Nutrition Foundation, Inc. at spring meeting in Chicago elected following food industry executives to its board: Roger Drackett, president of Drackett Co., Cincinnati; Hanford Main, president Sunshine Biscuits, Inc., Long Island City, N. Y.; Roy L. Pratt, president California Packing Corp., San Francisco; Frederick W. Specht, president Armour & Co., Chicago; and Paul Young, president, Golden State Co., Ltd., San Francisco.

National Biscuit Co. has purchased the Carr-Consolidated plant built in St. Louis after the war.

Perfect Foods, Inc., Lansdale, Pa., recently held a week-long "open house" celebrating opening of its new plant which occupies a whole city block. Company makes pretzels, potato chips, and cookies.

Saskatchewan Co-operative Producers, Ltd. recently started production in a new 1,000-bbl.-a-day flour mill.

Southern California Berry Growers Assn. has established a cannery plant in Colton, Calif. to can and freeze boysenberries under Farm Brand label.

Swift & Co. opened its first ice cream plant in Kansas with the purchase of Snyder Dairy Products Co., Inc., of Wichita.

(Men, Jobs, Companies Continued)

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AN ALKALI- AND ACID-PROOF CEMENT

makes food plant floors CORROSION-PROOF

ATLAS Floors of tile joined with Alkor cement are inert to conditions which cause concrete floors or cement jointed tile floors to disintegrate. This is because Alkor acid and alkali-proof cement is as inert to corrosion as is the tile itself.

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There are several methods of laying Atlas tile Alkor jointed floors. Atlas engineers will be glad to study your corrosion problem and refer you to a tile contractor in your area qualified to install Atlas food plant floors. No obligation — of course.

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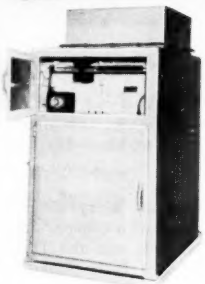
OMEGA LOSS-IN-WEIGHT DRY FEEDER



For automatic seasoning of food products in proportion to flow, the OMEGA LOSS-IN-WEIGHT GRAVIMETRIC FEEDER is a natural. It feeds continuously by weight with an accuracy of 99% or better and is instantly responsive to the slightest rate adjustment. Feeding action is steady and precise even with hygroscopic materials . . . ideal for proportioning seasoning into liquid solutions or dry mixes. Write today for descriptive bulletin—address Omega Machine Company (Division of Builders Iron Foundry) Providence 1, Rhode Island.

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THE LAST WORD IN FEEDERS
OMEGA

HARALD SYNNESTVEDT, Sr., president of New England Fish Co., Seattle, was elected president of National Fisheries Institute, Inc., at recent convention in Chicago.

Skagit Packing Co. has been formed through merger of Mt. Baker Packing Co., Acme, Wash. and Leigh Packing Co., Mt. Vernon, Wash.

Weber Food Products Co. has been organized in Chicago to make almond paste.

Personnel

J. M. Albright, former head of baking department of Marshall Field & Co., Chicago, has joined American Bakeries Co., Atlanta, Ga.

H. G. S. Bain, has been elected president of Canadian Crown Cork Co., Ltd., Montreal, P. Q., Canada.

Joseph Burnett, formerly superintendent of Pan Confections plant of National Candy Co. Division of Chase Candy Co., has been appointed superintendent of Melville Confections, Inc., Chicago.

Leonard G. Blumenschine, president of the Best Foods, Inc., has been elected a director of Diamond Match Co.

James Curtis has been elected president of Coca-Cola Export Corp. and Coca-Cola Export Sales Co.

Dr. Berton S. Clark, Chicago, has been re-elected president of Associates, Food & Container Institute, Inc.

D. A. Davidson, president of Refined Syrups & Sugars, Inc., has been appointed a director of two newly-chartered membership organizations

(Men, Jobs, Companies Continued)

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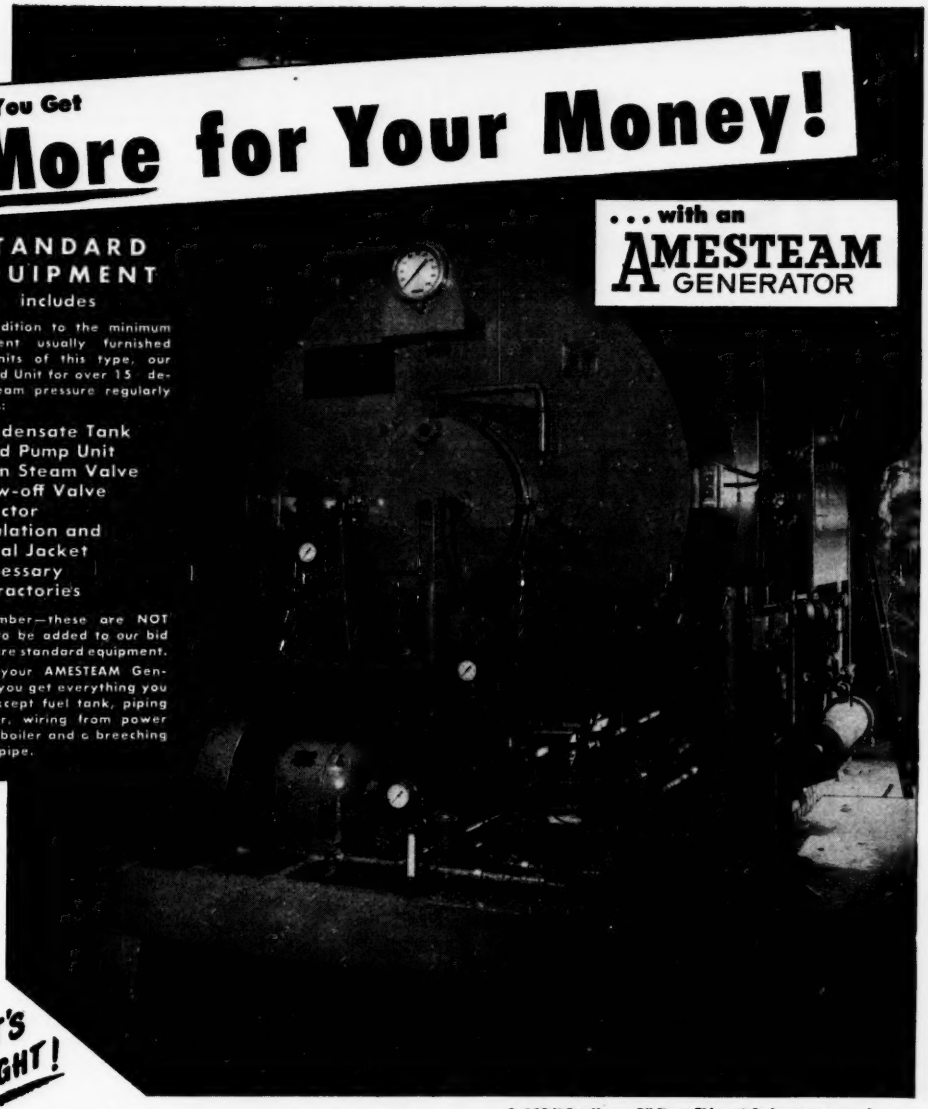
. . . with an AMESTEAM GENERATOR



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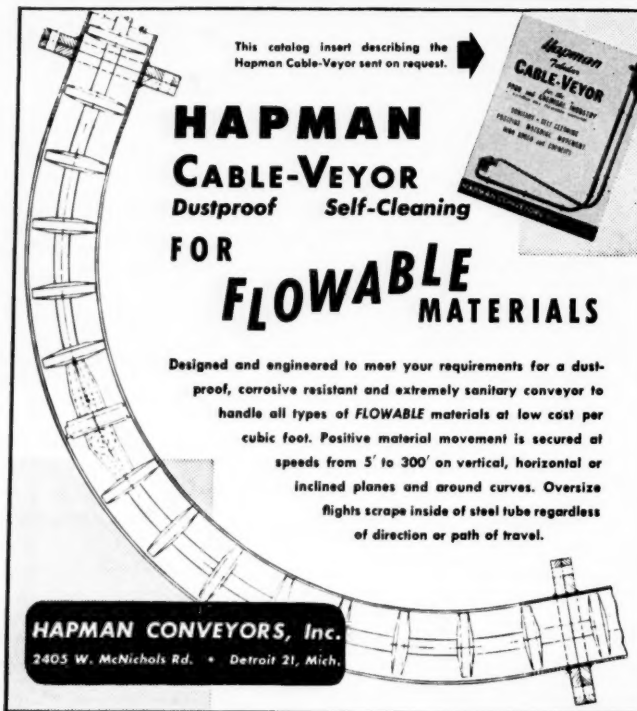
Designed and engineered to meet your requirements for a dustproof, corrosive resistant and extremely sanitary conveyor to handle all types of *FLOWABLE* materials at low cost per cubic foot. Positive material movement is secured at speeds from 5′ to 300′ on vertical, horizontal or inclined planes and around curves. Oversize flights scrape inside of steel tube regardless of direction or path of travel.



HAPMAN CONVEYORS, Inc.
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known as The Sugar Association, Inc., and Sugar Information, Inc.

John E. Gross, Colorado AFL official, was appointed chief of ECA's special mission to Norway. He succeeds A. E. Staley, Jr., who returns to his post as president of A. E. Staley Manufacturing Co., Decatur, Ill.

E. S. Lacey has been appointed manager of technical products plant of Swift & Co. in Hammond, Ind.

J. B. Lander has been made general manager of B. C. Tree Fruits Ltd., Kelowna, B. C., Canada.

Wesby R. Parker, vice-president in charge of sales division of General Foods Corp. has been elected a director of Arnold Bakers, Inc., Port Chester, N. Y.

Byron M. Shinn, formerly head of nutrition and canning technology development for Armour & Co., Chicago, has been placed in charge of firm's new product development kitchen.

Dr. P. R. Record of Security Mills, Knoxville, Tenn., has been re-elected chairman of nutrition council of American Feed Manufacturers Assn.

A. F. Snyder, Dushore, Pa., was re-elected president of Ice Cream Manufacturers Assn. of Pa., N. J., and Del.

Dr. F. T. Wahlen, professor at Ecole Polytechnique Federale (Agriculture) in Zurich, Switzerland, and a member of the Swiss Senate, will become head of Food & Agriculture Division of UN on Sept. 1, 1949.

Ralph A. Wenger, formerly president and general manager, Scott-Burr Stores, has been elected chairman of executive committee of Chase Candy Co.

Associated Industry

Builders Iron Foundry, Providence, R. I., announces promotions of E. H. Bradley to executive vice-president and I. O. Miner to vice-president.

Robert Gair Co., Inc., New York, N. Y. announces incorporation in Delaware of a subsidiary, Fibre Board Container Corp., which has required assets and business of Fibre Board Container Co. of Richmond and Martinsville, Va.

(Men, Jobs, Companies Continued)

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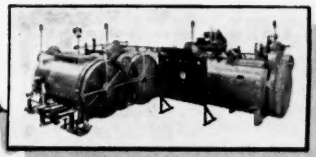
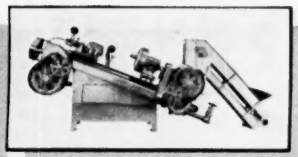
FOOD MACHINERY AND CHEMICAL CORPORATION

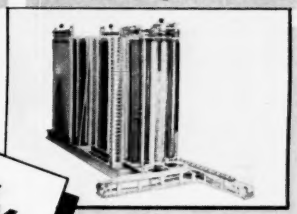
Your Warranty of Worth



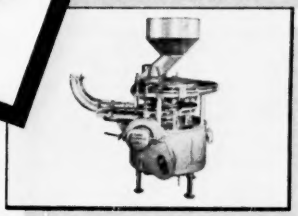
FMC Continuous Pressure Cooker—Cooler



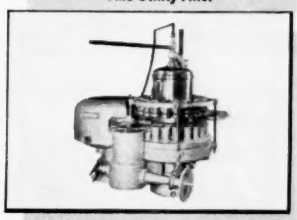
FMC Continuous High-Pressure Steamer



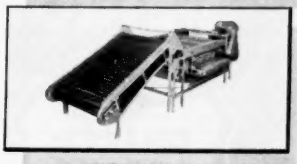
FMC Continuous Freezer



FMC Utility Filler

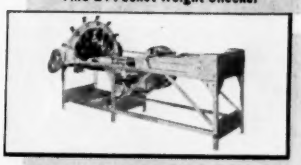


FMC Vacuum Syruper



FMC Tri-Roller Sizer

FMC 24-Pocket Weight Checker



FMC Peach Slicer

The FMC trademark on food preparation and processing equipment is your guarantee of the utmost in design and engineering. It stands for the highest standards of manufacturing from the most select materials. It represents "built-in" experience based on nearly 70 years of pioneer work in providing equipment for leading food processors everywhere. All of these factors combine to spell efficiency and economy in your plant operation.

FMC's expert engineering staffs and trained sales representatives are always ready to serve your requirements for canning or freezing equipment.

PARTIAL LIST OF PRODUCTS

Aligners, Can
Blanchers, Vegetable
Boxers
Brushers, Corn Silk
Cappers, Steel
Casers, Can
Checkers, Can Weight
Choppers, Tomato
Cleaners, Can
Cleaners, Vegetable
Cocktail Lines, Fruit
Coils, Cooking and Preheating
Cookers, Continuous Pressure
Cookers, Round Shell & Round Bottom
Coolers, Continuous Pressure
Coolers, Round Shell & Round Bottom
Compression Units, Shipping Case
Conveyors, Canned Fruit
Conveyors, Sorting (flat wire, rubber, stainless)
Conveyor Belts, Flat-top Stainless
Crushers, Tomatoes, etc.
Cubers, Fruit
Cutters, Vegetable
Dispensers, Syrup
Drainers, Can
Driers, Can
Dumpers, Stacked Box
Elevators, Blancher Combination
Exhaust Boxes
Extractors, Vegetable Juice
Fillers, Cans-Jars-Cartons
Finishers
Freezers, Continuous (Packaged Foods)
Graders, Fruit & Vegetable
Harvesters, Corn
Huskers, Green Corn
Kettles, Open & Jacketed
Labelers, Can & Jar
Milk Lines, Continuous (evaporated)
Mixers, Corn
Pasteurizers, Can
Pasteurizers, Juice
Peelers, Fruit & Vegetable
Pitters, Cherry-Olive-Peach
Preheaters
Retorts
Scalders, Tomato & Peach
Sealers, Shipping Case
Shakers, Fruit & Dry Spinach
Sizers, Fruit & Vegetable
Slicers, Apple-Peach-String Bean
Snippers, Bean
Strainers, Juice & Pulp
Syrupers
Tomato Lines
Toppers, Beet
Transformers, Pineapple
Trimmers, Corn Ear
Washers, Fruit & Vegetable

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ANDERSON-BARNGROVER DIV. *General Sales Office* SAN JOSE 5, CALIFORNIA

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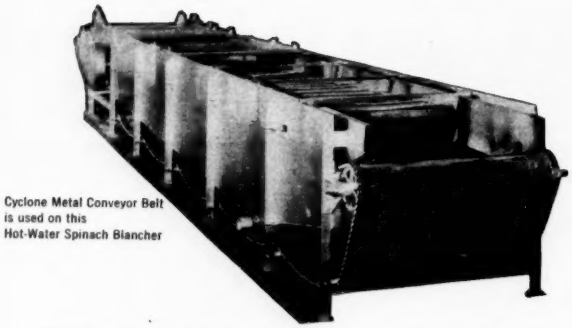

Cyclone Metal Conveyor Belt is used on this Hot-Water Spinach Blancher

For the Tough Processing Jobs . . .
Cyclone Metal Conveyor Belts

If your processing operations call for conveyor belts to operate through water, steam, heat, oils or chemicals, then yours is a job for Cyclone Metal Conveyor Belts. Immersion can't affect their operating reliability, making them especially adaptable for conveying materials and products in and out of liquid baths and sprays.

Available in three styles . . . Chain Link (shown), Flat Wire and Flex-Grid . . . and in a variety of sizes, metals and alloys, Cyclone Metal Conveyor Belts will save you money by speeding production, reducing labor costs and cutting maintenance.

For the full story on Cyclone Metal Conveyor Belts, write for Catalog No. 4, or ask the nearest Cyclone sales office for detailed information. You'll find offices in most principal cities.

USS

By the Makers of Cyclone Fence
CYCLONE FENCE DIVISION
(American Steel & Wire Company)
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UNITED STATES STEEL EXPORT CO., NEW YORK

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Men, Jobs, Companies

Hamilton-Thomas Corp., Hamilton, Ohio, has elected E. E. Baker vice-president of public works pump division and W. G. Rosendahl vice-president of its machine tool division.

Hapman Conveyors, Inc., Detroit, announces appointment of Peter P. Ruppe as general manager.

Package Machinery Co., Springfield, Mass. has purchased manufacturing rights and plant facilities of Frank D. Palmer, Inc., Chicago.

Diversey Corp., Chicago, has purchased all common stock of General Reduction Co., Macon, Ga.

Horace T. Potts Co., Philadelphia, announces appointment of Joseph J. Folz as technical specialist on stainless steel tubing and fitting problems.

Stone Straw Corp. of Canada, Ltd., Toronto, Ont., has started building a new 45,000 sq. ft. plant in Mimico, Ont.

Deaths

E. J. Bernard, 57, central division sales manager of Kraft Foods Co., Chicago, Ill.—June 1 at his home, Skokie, Ill.

Harley J. Credicott, Freeport Dairy & Produce Co., Freeport, Ill., former president of American Butter Institute—at his home in Freeport, Apr. 27.

Edward M. Darrimon, 59, president of San Diego Packing Co., San Diego, Calif.—May 6.

Alan McKay, manager of tea department of B. C. Ireland & Co., San Francisco, and sec-treas. of Western States Tea Assn.—of a heart attack, May 2.

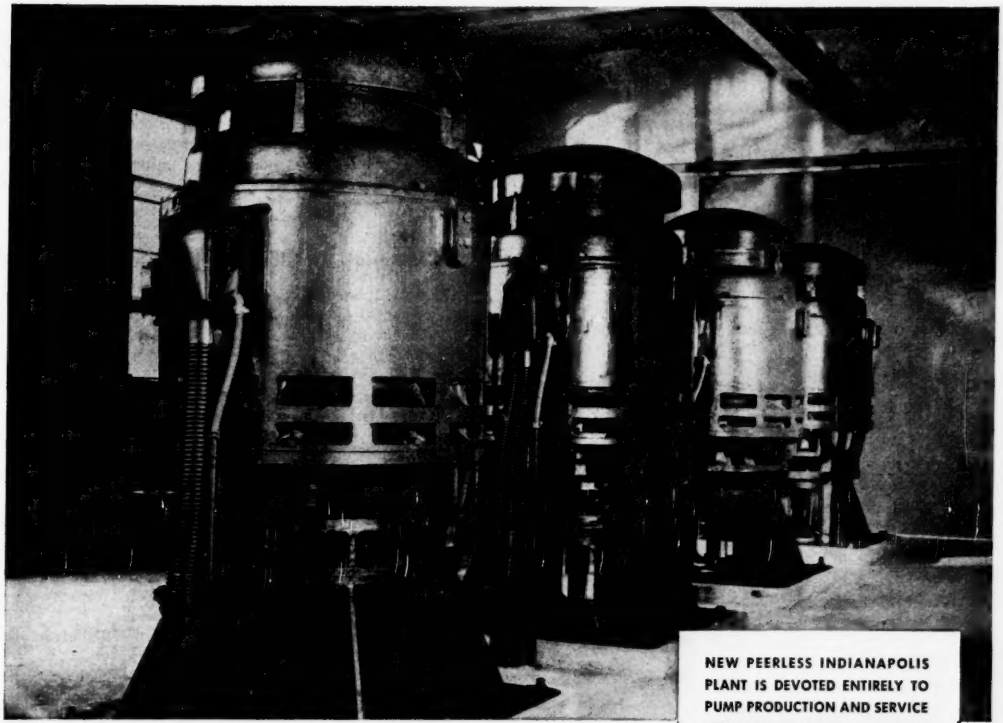
John S. Prescott, 60, vice-president, secretary, general counsel and a director of General Foods Corp.—at his home in New Rochelle, N. Y., May 19.

Lucius M. Tolman, 74, former research and technical director of Wilson & Co.—at his home in Chicago, April 29.

William A. Zickgraff, 73, founder of Bake-Rite Bakery and former president Illinois Bakers Assn.—at his home in Peoria, Ill., April 25.

Maurice L. Wurzel, president of Loft Candy Corp.—in Philadelphia, May 14. —*End*

PEERLESS VERTICAL TURBINE PUMPS



CUT OVERHEAD Underground

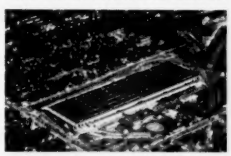
For your next job consider the flexibility and the efficiency of the Peerless vertical turbine pump.

As a deep well pump, for example, a Peerless pump can assure you of an independent source of clean water from your own well—water that will be of constant temperature, of constant chemical analysis. To cut overhead underground, Peerless turbine pumps embody many exclusive engineering advantages, such as patented Double Bearing-Double Seal bowl construction, all contributing to their extended trouble-free pumping life.

As another example, a Peerless vertical turbine pump utilized as a close-coupled pump, assures you of full turbine pump utility and capacity from short or medium settings. They're ideally suited for installation over pits, sumps or basins or for pumping water from surface sources. The 4 pumps shown above are indicative of this type of service. You can easily visualize their application to condenser cooling, cooling tower service, etc.

Regardless of your requirements, a versatile Peerless vertical turbine pump will squarely meet your pumping demands. Peerless offers widest capacity range, from 15 to 30,000 gpm against heads to 1000 feet. You can have your choice of oil lubricated or water lubricated types and a choice of power drive, direct-connected electric, right angle gear, V or flat belt or combination drives. Write for individual Bulletins describing the applications of Peerless pumps to these services.

NEW PEERLESS INDIANAPOLIS PLANT IS DEVOTED ENTIRELY TO PUMP PRODUCTION AND SERVICE



Here is one of America's newest pump plants—19 acres of modern manufacturing facilities devoted to precision production of horizontal and vertical pumps, centrally located at Indianapolis. Plan with Peerless for pumps plus fast, complete pump service.

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION

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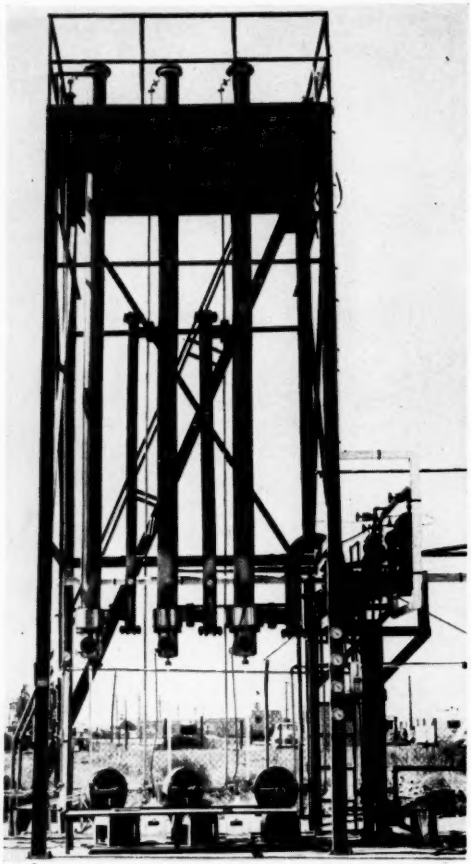
Peerless
VERTICAL AND HORIZONTAL
Pumps

Food Equipment News



Concentrator Uses Water as Heat Transfer Medium

Using water as a medium for the transfer of heat and a refrigerated cycle adapted to the evaporating cycle, an unusually efficient new low temperature high-vacuum concentrator has been developed.

Refrigerated water is employed to condense the vapors. The heat absorbed by the refrigerant which chills the water is imparted to the medium used to condense the refrigerant. Then the heat in this medium supplies the Btu. for evaporating the product being concentrated.

A triple-effect falling-film evaporator is employed. The heating medium for the first effect is the 90 deg. F. refrigerant condenser water.

Juice enters at room temperature, approximately 75 deg. F., and it is necessary to add only the latent heat of evaporation to this original juice.

Vapors liberated from the juice in the first effect are used as the heating medium for the second effect, and vapors from the second effect become the heating medium for the third effect, with final temperature of the evaporation cycle 50 deg. F.

Vapors at 50 deg. F. from this third effect are condensed with 37 deg. chilled water. Outlet temperature from the condenser is 45 deg. F.

A centrifugal compressor, with its conventional package type design, is used. This eliminates the need of refrigerant piping throughout the plant.

Juice leaves the third effect as a concentrated product. Retention time of the product being concentrated is about 45 to 50 sec. Total plant of the large size variety has an inventory of liquid at one time of approximately 3-min. flow.—*C. E. Howard & Co., 9001 Rayo Ave., South Gate, Calif.*

Dry Materials Blended Continuously in New Mixer

Practically any finely granulated or powdered ingredients can be mixed or blended continuously in a new-type high speed centrifugal mixer. It produces a finished mixture at rates up to 200 lb. per min. Thus, where ingredients percentages are sufficiently large to allow accurate metering, truly continuous operation is achieved.

After mixer has been installed, with feed and take-away systems provided for, the overall operating cost is less than 1/100 of 1c. per lb. of treated material.

Continuous operation enables a reduction in the mixing time and an increase in production. High speed centrifugal action breaks up lumps resulting in a more homogeneous product.

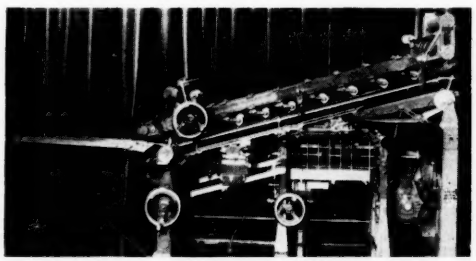
The machine is compactly designed. It requires only 12 cu. ft. of space (3 ft. high x 2 ft. dia.), is easy to install and operate. Enclosed motor is connected directly to a specially designed high speed mixing rotor.

The rotor consists of two steel disks spaced slightly over 1 in. apart by specially designed impactors.

Material entering inlet of the machine is fed by a distributor to the center of the rotor and spun out by centrifugal force in a thinning film as it approaches perimeter of the rotor. It is discharged uniformly through a conical hopper to the outlet.

Peripheral speed of the rotor is more than 12,000 ft. per-min., producing a thorough blend of all ingredients.

Unit is available in three sizes: 2,500, 10,000 and 15,000 lb. per hr. capacities.—*Entoleter Division, The Safety Car Heating and Lighting Co., Inc., P. O. Box 904, New Haven 4, Conn.*



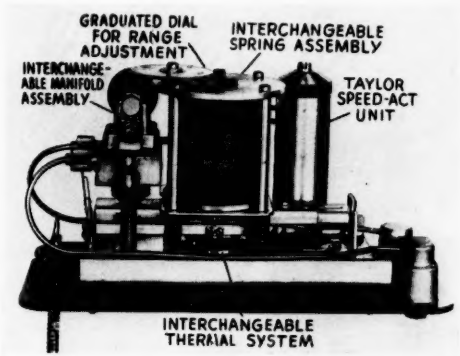
Labeling Machine Also Elevates Containers

Recognition that unscrambling, labeling, casing and sealing operations must be on progressively lower levels for economical operation, led to introduction of the "New Way Model E" labeling machine with straight-through elevating principle.

Instead of operating on downhill or level carriers this unit labels the containers as they are elevated and discharges them at a point 12 in. or more higher than at the feed end.

This recent development permits a straight flow from container closing machines with the labeler lifting to case sealers, eliminating the need for one or more elevators in the line.

New model is fully adjustable for containers from 1½ to 5⅛ in. in dia. by 1¾ to 7 in. in height.—*Chisholm-Ryder Co. of Penna., Hanover, Pa.*



Temperature Transmitter Is Highly Responsive

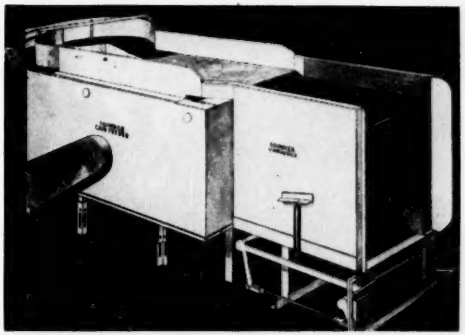
Where it is desirable to have the temperature indication, record or control remotely located from the point of measurement, and where it is necessary to have accuracy, high speed of response, small thermal elements and short range spans within the limits of —375 and +1000 deg. F., a new force-balance type pneumatic temperature transmitter called the "Transaire" with "Speed-Act" recently has been announced.

One of the outstanding features of this new instrument is the incorporation of "Speed-Act which applies the principles of Pre-Act or derivative action directly to temperature determination, an entirely new measurement technique developed by the company.

It overcomes the lag inherently present in the response of any form of thermal measuring element. This feature makes possible a quality of measurement not before attainable with any temperature measuring element, particularly those requiring separable wells.

Employing advanced force-balance principles, the instruments output in psi, is proportional to the temperature of its thermal element, and by means of ¼ in. o.d. copper tubing, this pressure change can be transmitted to a recording or controlling receiver located as far as 1000 ft. away, and possibly more, depending on conditions.

Other features of the transmitter are: (1) Rapid speed of response to make possible more accurate control; (2) small thermal elements (cigarette size); (3) short range spans to permit closer readings; (4) adjustable operating ranges to permit a wider range of application by individual instruments; (5) Fixed air output range of 3 to 15 psi. for full temperature span is linear to 0.1 percent assuring repeatability of readings; (6) compensation for barometric and ambient temperature changes to assure constantly accurate performance; (7) interchangeable unit assemblies so that overall operating limits of the instrument can be changed; and (8) thermal systems built to withstand overrange temperatures up to 1000 deg. F.— *Taylor Instrument Cos., 95 Ames St., Rochester 1, N. Y.*

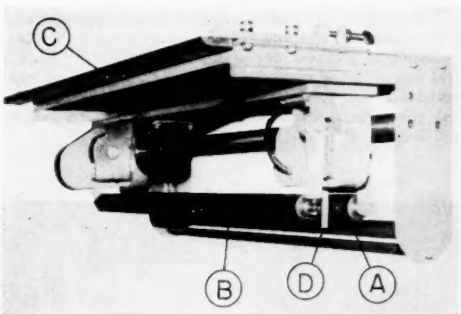


Unit Unpacks and Feeds Cans From Bags

To eliminate one of the most wearisome jobs in a canning plant, a combination can unpacker and feeder is announced. It is designed to handle cans that are shipped in bags.

Operation of the unpacker is very simple. Cans in the bag are pushed forward, one layer at a time, onto the woven belt leading to the feeder. By means of a lever, each layer is raised to the desired level and pushed onto the conveyor belt. When the last or bottom layer is delivered to the feeder, a new bag is placed in the unpacker.

The can feeder is entirely automatic. It will handle cans of any size and deliver to the conveyor any desired number up to 1,000 cans per min., if such capacity is required.— *Skinner Machinery Co., Inc., Dunedin, Fla.*



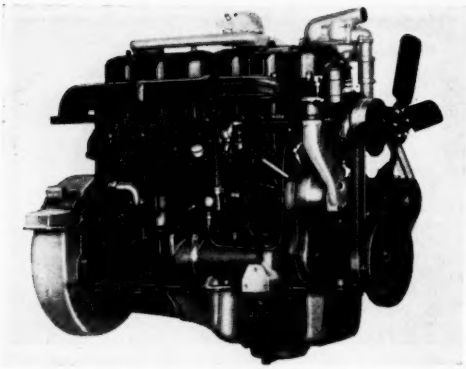
Automatic Guider Centers Conveyor Belts

Light canvas or coated fabric conveyor belts are held on center or moved back to center if they run out of line by application of this recently improved automatic belt guider.

Installation is at the loading end of the conveyor on the return run slack side. The belt is threaded over roll (A) and under roll (B) to move upward to knife-edge (C) on the top plate of the assembly.

Roll (A) rides on fixed bearings and one end of roll (B) also is fixed. The other end of roll (B) is supported in a bearing at the end of an arm that is moved through an arc by a 1/50 hp. reversing motor.

This motor is controlled by a double-throw switch actuated by feeder arm (D) which anticipates the belt "wanderlust". Side movement of the belt in either direction will actuate the switches and cause the motor to move roll (B) out of line in correcting direction. The unit is available in 13 sizes for belt from 24 in. to 48 in. in width.—*J. W. Greer Co., Cambridge, 39, Mass.* (Food Equipment Continued)



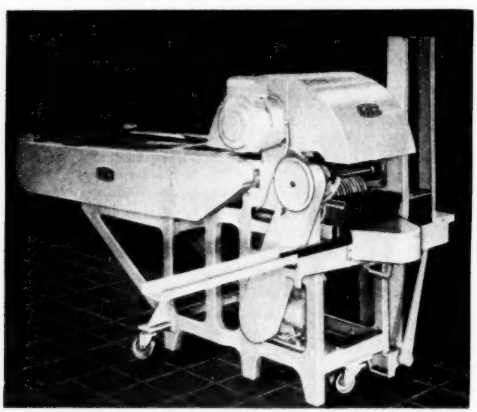
Low-Peak Pressures Maintained In New Diesels

Three new diesel engines, the END 457, 510 and 672, designed specifically for the tractor-trailer combination, have been put into production.

Operating on the four-stroke cycle, these engines are designed to provide controlled combustion and maintain low peak pressures. Exclusive combustion chamber design produces extremely high turbulence which results in complete combustion to exert a sustained pressure and produce a smooth, powerful piston thrust.

At the same time the rate of combustion is controlled, avoiding the hammer-blow effect on pistons commonly associated with diesels having uncontrolled characteristics. Marked fuel economy is also claimed through this improvement. Company describes these engines as smokeless, odorless and free from strain.

Variable and automatic injection timing, synchronized to the speed of the engine, is provided by company's "Synchrovance". By this device injection is timed for the ideal amount of advance for each speed. Result is utmost available power and torque at all speeds, with minimum peak pressures and less combustion shock.—*Mack Trucks, Inc., Empire State Bldg., New York City.*



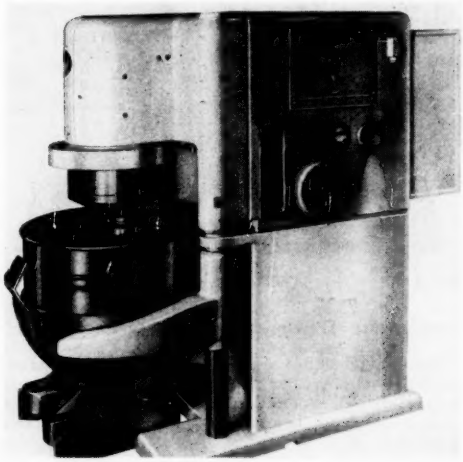
Round Rolls Sliced, Packaged Automatically

Time-saving and labor-saving in the slicing and packaging of round sandwich rolls are chief features of the completely automatic roll slicer packager.

The operator dumps the pan of rolls into the loading conveyor—and that is the last time they need be handled until the wrapped package of rolls comes off the machine.

Rolls dumped into the loading conveyor are automatically stood on edge and passed beneath the slicer blades. After slicing they are automatically picked up and placed in open cartons. Cartons, meanwhile, have been automatically fed from a magazine at one end of the machine and pushed over to the loading station, where mechanical fingers open them. The loaded cartons are then automatically transferred to the bread wrapping machine.

Based on 6-roll cartons, unit will deliver up to 38 packages per min.—a total of 13,680 rolls per hr.—*Read Machinery Div., The Standard Stoker Co., Inc., York, Pa.*



Mixer Offers Head-Beater Ratio Selection

To assure optimum results in mixing and whipping, a new dual-ratio feature permits head-beater ratio selection on the Glen "340" Mixer.

This feature on the mixer gives bakers two ratios on one machine for perfect mixing control. All the other features, including variable speed drive are retained in the new machine.

For whipping, the ratio selector lever is turned to "Fast" and the 2 to 1 ratio is used (the beater revolves 2 times while the head revolves once in the bowl). For mixing, the lever is turned to "Slow" and the 4 to 1 ratio is used. (The beater revolves 4 times while the head revolves once in the bowl).

The ratio selector lever also permits the operator to stop the rotation of the head anywhere in the bowl while the beater continues to revolve. The resulting vortex makes possible the addition of large quantities of egg whites, raisins, fruit, etc., in considerably less time than is required with an ordinary, single-ratio vertical mixer. Distribution of these added ingredients is instantaneous, not only saving time, but preventing ingredients, such as raisins, from being crushed against the sides of the bowl and discoloring the batch.

For mixing, the new feature improves shortening dispersement, thereby increasing the stability of the batter structure. The resulting finer-grained cell structure assures better oven tolerance.—*Bakery Division, American Machine & Foundry Co.,* 485 *Fifth Avenue, New York City* 17.

(Food Equipment Continued)

Are YOU proud of the wrappers for YOUR product?

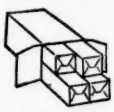
Is your wrapper smart looking? Up-to-date? Is it helping make sales? Does it give your product real protection? Why not look into Patapar Vegetable Parchment? With Patapar wrappers you'll get the utmost in sales appeal and protection.

Sales appeal comes from Patapar's rich, white texture and colorful printing. Protection comes from its qualities of high wet-strength and resistance to grease.

We print your Patapar wrappers in our own plants which are specially equipped for doing the job beautifully and economically.

Suggestion: Send us your present wrapper, with any ideas you may have for freshening up the design. We will gladly submit, without charge, our artists' interpretation for a colorfully printed Patapar wrapper for your product.

Wonderful for



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Cheese Wrappers

Pie Mix Bags

Milk Can Gaskets

Can Liners

Vegetable Wraps

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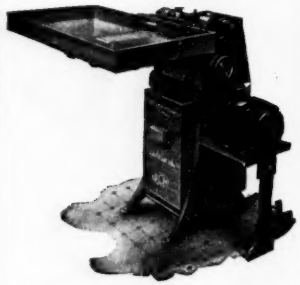

The "Turnbull" type ORANGE PEEL CHIPPING MACHINE manufactured by Wm. Brierley, Collier & Hartley, Ltd., Rochdale, England.

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ASCORBIC ACID
Gives Stabilizing Piquancy

THIAMIN
Promotes Desirability

SPICES
Impart Subtle Flavor

ORGANOLEPTIC
Tests by Snell

give advance determination of consumer reaction.

Let us develop the finer flavor to boost your sales. Inquiry entails no obligation.

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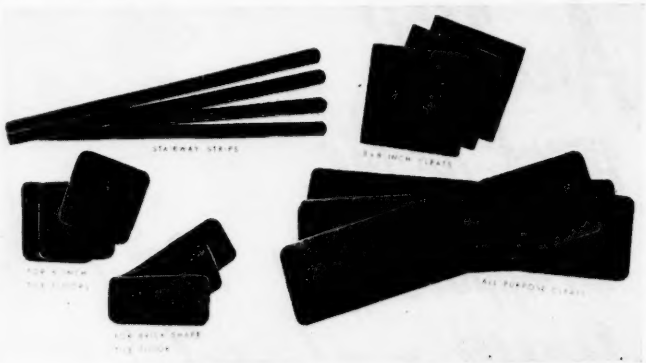
Engineers

29 W. 15 St. New York 11, N.Y. WA 4-8800



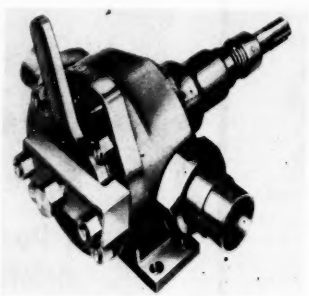
Non-Slip Walkway Material Is Simple to Install

For stairs, ramps, catwalks, building entrances and floors, a new type of "Safety-Walk" non-slip material is announced. The new material, Type B, is coated with a pressure-sensitive adhesive which is said to permit inexperienced people to lay it "as easily as cellophane tape".

Hard mineral grains are surface-coated on a toughened fabric, affording non-slip safety underfoot "even when completely covered with water, mud, oil, or grease", states the manufacturer.

Made in red, green, silver and natural black, material is provided in factory-cut stairway strips, brick-size cleats, tile-size cleats, larger all-purpose cleats, and in roll form.

The pressure-sensitive adhesive coated on the underside of the material is protected by Holland cloth liner which is pulled off just prior to application.—*Minnesota Mining & Manufacturing Co., St. Paul, Minn.*

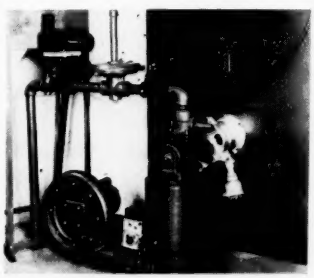


Offers New Sanitary Pump For Continuous Processes

Dairy and other food industries will find a newly-developed, variable volume, sanitary pump of interest. New unit employs the well-known Tri-Rotor pumping principle, and is especially adaptable in continuous processing systems.

Constructed of nickel alloy metal, the pump is equipped with a manually-operated volume control type head and with either sanitary mechanical seals or conventional food packing (optional). Pump shaft is machined from "K" Monel metal and has a spline connection for quick removal from flexible coupling or other types of drive mechanism.

Unit is stated to be the only low-priced sanitary pump equipped with variable volume control. Volumetric capacity can be changed from maximum to zero without stopping the unit. —*The Yale & Towne Manufacturing Co., Chrysler Bldg., New York* 17.



Gas Boiler-Burner Package Is Offered In New Series

Only gas piping and electric wiring are needed to complete installation of the pre-engineered elements of the new Series "BB" boiler burners, which are shipped as complete packages with protective equipment and pressure controls. Burner assemblies for gas-firing boilers range from 10 to 180 hp.

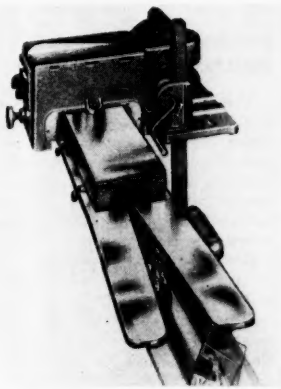
Principal element of the unit is the "Pow-R-Sembly", including constant

pressure blower, single or double burner nozzles each with compact proportional mixer, zero regulator, motorized air valve, electric ignition pilot, and manual reset safety gas valve.

Steam pressure controls, or remote thermostatic control, or both are furnished in the packaged unit.

The burners operate automatically over three steps of heat output. For light loads the pilot operates, while the main burner automatically takes over at "low fire" as required.

Units are supplied with valves sized for manufactured and mixed gas, or for natural and lp. gas.—*Bryant Industrial Div., Affiliated Gas Equipment, Inc.*, 1020 *London Rd., Cleveland* 10.



New Automatic Heatsealer Handles Wide-Top Bags

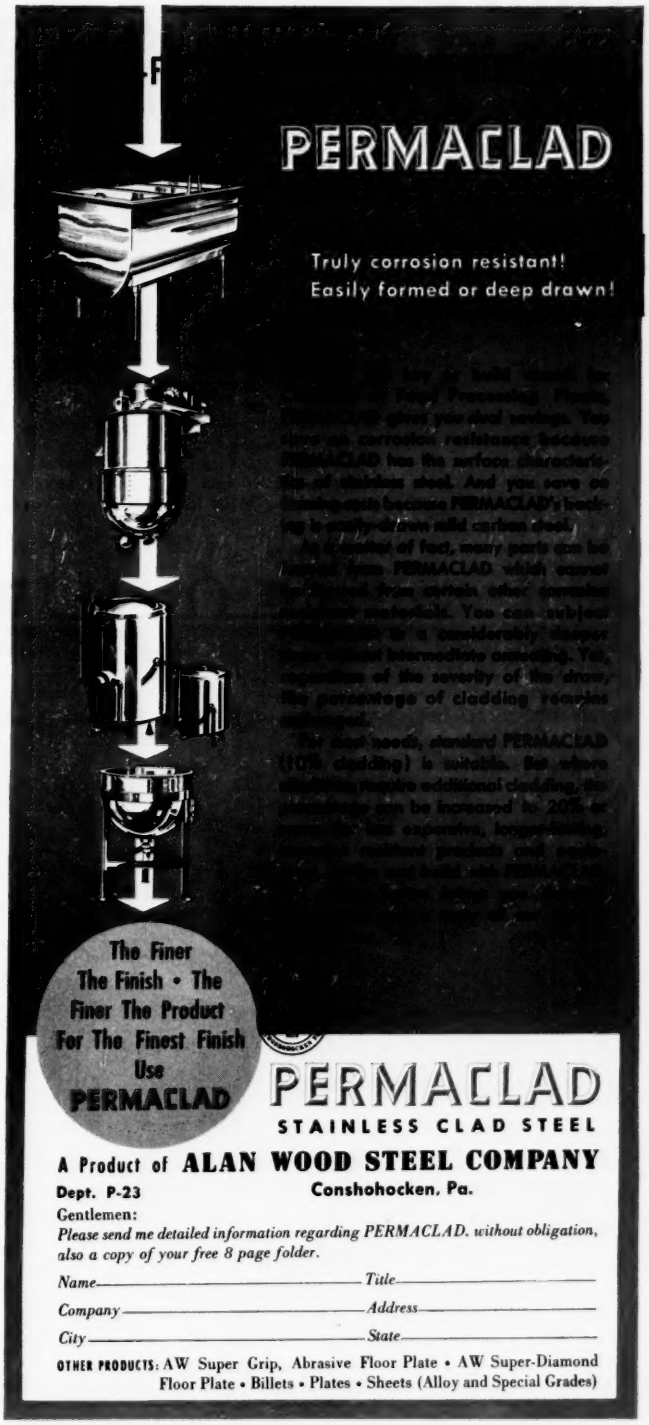
Designed to dispense entirely with an operator at the sealing machine is a new rotary-type bag heatsealer.

Bags simply are dropped from a filling machine onto a traveling conveyor belt and approach the machine wing entrance. Even bulky bags with wide-spread tops will pass through the extra-wide entrance.

Silent chains are the guides which close the bag tops as they travel along the gradually tapered feed wing, until front and back surfaces of bag tops meet upon entering the preheater area. Chains move at the same speed as the bottom conveyor, so that side friction and tipping of bags are prevented.

The chains also grip the bag tops and carry them through preheater, where a foldover may be made, and through the heat-sealing rolls. Bags are then discharged on a conveyor or chute, fully heat-sealed and ready for packing for shipment.—*Pack-Rite Machines*, 714 *W. Wisconsin Ave., Milwaukee* 1, *Wis.*

(*Food Equipment Continued*)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Truly corrosion resistant!
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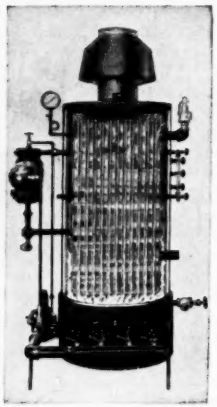
OTHER PRODUCTS: AW Super Grip, Abrasive Floor Plate • AW Super-Diamond Floor Plate • Billets • Plates • Sheets (Alloy and Special Grades)

TRULY AN ENGINEERED "PACKAGED" UNIT



The KANE Boiler is built to A.S.M.E. specifications, in sizes to 30 H. P.

the KANE BOILER PACKAGE

Each KANE BOILER PACKAGE is carefully considered by us as an "individual" job—from the customer's requirements to the finished unit. And each BOILER PACKAGE is a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating effciency.

Engineered steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

J&C ZENITH CONTINUOUS PULP PRESS

WITH J&C'S NEWEST DEVELOPMENT "Floating Cone"

JACKSON & CHURCH COMPANY'S ZENITH CONTINUOUS PULP PRESS offers GREATER efficiency and GREATER profits ... with the hydraulically operated cake discharge port or "floating cone."

Long the finest dewaterer on the market, Zenith's new 100% automatic operation assures CONSTANT UNIFORM discharge pressure at any predetermined degree. Finger-tip adjustment assures drier cake of uniform consistency.

These engineering triumphs ... found only in Zenith Press ... are available to paper pulp, cannery, corn starch, fish reduction, meat packing, glue, citrus waste drying and many other processes.

For further plant uses, for individual problems or for engineering or additional data, write Jackson & Church Company at Saginaw, Michigan.

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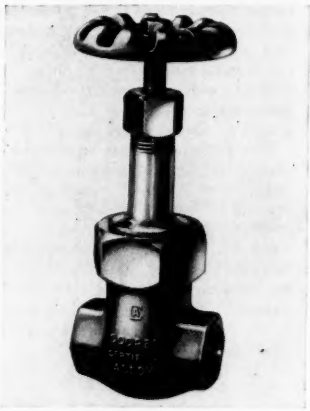
JACKSON & CHURCH COMPANY, SAGINAW, MICHIGAN

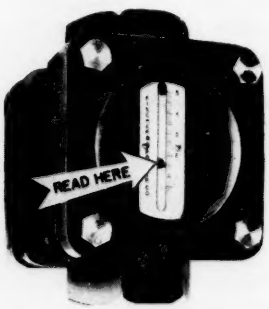
"Work well done since '81"



Stainless Steel Gate Valve Built for Long Service

Construction features of new compact stainless-steel gate valve include union bonnet design for long service and simplified maintenance, ball and socket point contact disks which adjust themselves in any position, and a minimum of six turns of packing to assure effective sealing.

Available in various stainless alloys, in sizes ½, ¾ and 1 in., this valve is suited for fixed plant installations, as well as for use on fabricated equipment.—*The Cooper Alloy Foundry Co., Hillside, N. J.*



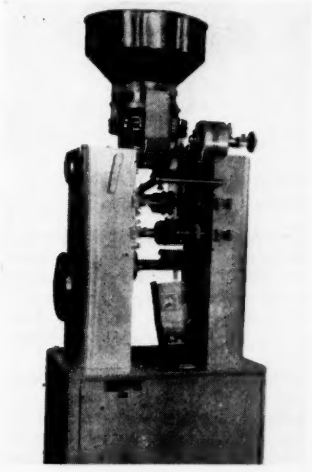
Flow-Rate Indicator Checks Clear and Opaque Streams

Equally useful for clear and opaque streams, a new rate-of-flow indicator is now being produced. Known as the "Magna-Sight" flow guide, it uses the company's standard bull's-eye body with a fixed diameter orifice at its vertical inlet.

A tapered plug which contains a permanent magnet is suspended in the

fluid stream within the orifice. The magnet causes an external steel ball to move against a calibrated flow scale when increasing flow rate causes the plug to rise. The rear enclosure is a heavy Herculite glass window to permit observation of the fluid.

Standard flow guides are made in 8 sizes from ¾ to 4 in. (screwed or flanged) to measure maximum flow rates of 3.5 to 250 gpm. Minimum measurable flow rate for any given indicator is 1/10 max. Flow guide is made of iron, steel, brass, bronze, or stainless steel.—*Fischer & Porter Co., Hatboro, Pa.*



High Speed Features Packaging Machine

Fully automatic high-speed fabrication, filling and sealing are features of a new packaging machine. Standard packaging films such as cellophane, Pliofilm, and foil laminates in either overall printed, plain or registered printed form can be used.

Machine feeds the product from a hopper to a set of precision machined measuring cups, which deposit the accurately measured loads through a forming tube into the packet. Feeding can also be accomplished by hand for irregularly shaped objects.

Unit is readily adjustable, and is flexible within a given range. The standard machine is able to make, fill and seal a package from 1 x 1 in. sq. up to 6 in. overall width, and 6 in. and longer, if desired, in length.

The apparatus is compact, occupying a floor space of 2½ x 2½ sq. ft. It is approximately 7 ft. high. The entire unit is operated on a ½ or ¾

(Food Equipment Continued)

FOOD INDUSTRIES AWARD

FOR FOOD TECHNOLOGY ACHIEVEMENT

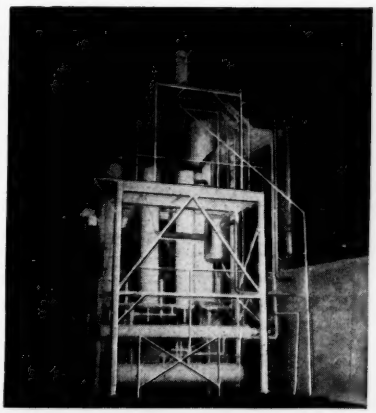
Goes to

Florida Citrus Canners Cooperative!

This signal honor to Florida Citrus Canners Cooperative, Lake Wales, Florida, for its major role in the development of unequalled frozen, concentrated orange juice quality is also high tribute to Mojonnier engineering, which made this achievement possible.

For Florida Citrus' contribution is based upon their use of the **Mojonnier Lo-Temp Evaporator** – the unit which has attracted widespread interest among food technologists everywhere for its totally new approach to the Condensing Art.

MOJONNIER BROS. CO.. 4601 W. OHIO STREET, CHICAGO 44, ILLINOIS



MOJONNIER LO-TEMP EVAPORATOR AT FLORIDA CITRUS

Mojonnier LO-TEMP concentrating orange juice 4 to 1 at 60° F. evaporating temperature as continuous process at Florida Citrus Canners Cooperative, Lake Wales, Florida. Since this photo was taken, four additional LO-TEMP units were installed, giving this plant a maximum production of 400,000 cans per day, or 6 times their original capacity.

Mojonnier

LO-TEMP EVAPORATOR

Setting the quality pace in the Frozen Citrus Concentrate Industry!

New DAY Autoclean DUST FILTER

PROVIDES CONTINUOUS AUTOMATIC CLEANING FOR CONSTANT AIR FLOW

- High Air to Cloth Ratios
- Effectively Filters Through Felt
- Continuous Reverse Jet Cleaning
- Low Back Pressure

Licensed by H. J. Hersey, Jr.

The New **DAY** "Autoclean" Dust Filter was designed primarily for industries requiring continuous automatic filtering with constant air volumes.

Actual installations are operating successfully with air to cloth ratios of 15 or 20 to 1, and with back pressures of only 1 to 2 inches water gauge. Such performance is made possible by the type of filtering felt used, and the gentle, yet effective, continuous reverse jet cleaning.

Check These Advantages

✓ ***CONTINUOUS CLEANING***—Low, constant back pressures result in uniform air volumes.

✓ ***CONTINUOUS OPERATION***—Reverse jet cleaning mechanism travels slowly up and down, blowing high pressure air back through the felt. This eliminates necessity of shutting down even part of the filter for cloth cleaning.

✓ ***PARALLEL AIR FLOW***—Dust laden air enters the plenum at top of filter. Air and dust travel together down through tubes toward continuous dust discharge below the tubes.

✓ ***ECONOMY***—Less filter required because: (1) higher air to cloth ratios are permissible; (2) no extra filter required to permit shutting off sections for cleaning.

Write-to-**DAY** for New "Autoclean" Dust Filter Bulletin.

DAY "Autoclean" DUST FILTER

The DAY Company

DAY SINCE 1881

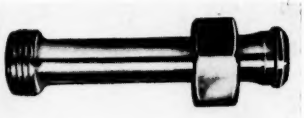
817 Third Ave. N. E., Minneapolis 13, Minn.
IN CANADA: P.O. Box 70D, Ft. William, Ont.
Branch Plants in Fort Worth, Buffalo and Welland, Ontario

hp. motor, depending upon the type feed head utilized.—*Triangle Package Machinery Co., 6633-55 W. Diversey Ave., Chicago 35.*

Hydraulic Scale Weighs Crane-Handled Goods

To save time and effort in the weighing of raw materials or finished products for meat packers, canneries and warehouses, a new type hydraulic scale has been developed. It weighs loads as they are being handled by overhead cranes.

This rugged, light-weight scale is attached to the hook of the crane. It is built in capacities of 0 to 1,000 lb., 0 to 2,000, and on up to 10,000 lb. Indicating dial is made in three sizes, 8½ in., 12 in. and 16 in. dia.—*The A. H. Emery Co., Stamford, Conn.*



New Stainless-Steel Fittings Have "No Joint" Feature

Utility and convenience for the dairy operator are stressed in "No Joint" stainless-steel fittings.

These fittings are fabricated by a new fusing process that makes them homogeneous—one piece units from end to end—eliminating the old type rolled or soldered joints.

New pipes are offered in lengths up to 16 ft., as well as a complete line of standard sanitary fittings equipped with "No Joint" feature.—*Universal Machining Co., Inc., 6615-28th Ave., Kenosha, Wis.*

—End

FACE THIS FACT ABOUT . . .

In 100 and 200 lb. drums

"FLAVOR-LOSS":

One of the oldest problems of the food packing industry *is being solved today by many canners!*

Accent *will SUSTAIN the natural flavors in the foods you pack*

Simple and startling is the test of Ac'cent.

No longer a matter for skepticism is the effect of Ac'cent in processed foods. It's been demonstrated time and again—in actual commercial processing and in the laboratory. Ac'cent does two things with amazing success: (1) *intensifies* natural flavor of food, (2) *guards* flavor against the usual loss in processing.

Ac'cent is now in regular use by many food processors whose products you know well.

We invite you to look into the information we have on the use of Ac'cent in many types of foods you pack. Members of our staff of food technologists and chefs are on call to consult with you in your plant and supervise tests.

Write **Amino Products Division, Dept. FI-7**
International Minerals & Chemical Corp.
General Offices: 20 North Wacker Drive
Chicago 6, Illinois

A TYPICAL TEST OF AC'CENT IN CANNED GREEN BEANS

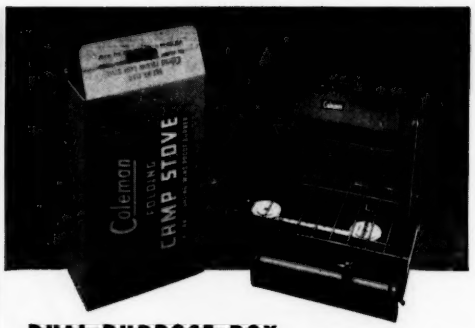
Add ⅜ teaspoon (about 1.2 grams) of Ac'cent to a filled #2 can of green beans just before sealing. Mark the can so that it can be identified, then process right along with your regular batch. After cooling and aging a few days, cut a control sample and the Ac'cent sample. Taste both. The difference will surprise you. The fuller, fresher, natural flavor of the beans with Ac'cent will be unmistakable.

Accent® makes food flavors sing♪

Trade Mark "Ac'cent" Reg. U.S. Pat. Off.
Printed in U.S.A.

GOLF CLUBS "Merchandised" in H & D Shipping Boxes

"We now pack three sets of clubs in the time formerly required for one," says a prominent golf club manufacturer. "This box not only makes an outstanding display, it also helps boost sales," says the golf professional who handles the merchandise. Compact, sturdy, easily assembled, attractively designed, this H & D box is engineered to save money for the manufacturer, to make money for his dealers. It scores high on both counts.



DUAL-PURPOSE BOX Increases Product Utility

One might think of a camp stove as an unwieldy piece of equipment — but not this one. It folds up neatly and compactly in a sturdy H & D box, designed especially to withstand the rigors of camp life. Box and stove take up little space in the camper's car; snug fit prevents rattle; convenient handle makes it easy to carry. This H & D packaging idea — of increasing the value of a product by making it easier to use — is virtually without limit in application possibilities.

Add Sales Punch WITH GOOD PACKAGING!

THIS SHELF PACKAGE Simplifies the Retailer's Job

The "Eskimo" kitchen mechanic, a modern idea in electrical appliances, takes full advantage of Prepak* — a new idea in packaging. No packing or wrapping at point-of-sale is required. Attractively printed on sand color linen background, the "Eskimo" package invites "take with" purchases, another saving for the dealer. In the home, the box provides safe storage and protection for the life of the mixer.

*REG. U. S. PAT. OFF.

REG. U. S. PAT. OFF.

H&D

BOXES

FOR MORE INFORMATION, WRITE

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Authority on Packaging

Executive Offices: 4902 Decatur St., Sandusky, Ohio

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Richmond 12, Va. • St. Louis 15, Mo. • Sandusky, Ohio
Toronto, Ontario • Watertown, Mass.

Catalogs, Bulletins

Food Plant Equipment

Fume Washers

Corrosion resistance and simple design without moving parts are among advantages cited for fume washers detailed with illustrations in 4-page folder.—*Maurice A. Knight Co., Kelly Ave., Akron 6.*

Reduction Gear Motors

Motor and speed reduction parts in a complete unit, heat treated gears and pinions, minimum number of parts, and easy accessibility are features of single and double reduction gear motors illustrated with specifications in 8-page Bulletin 3600-H. —*Westinghouse Electric Corp., Nuttall Works, Gearing Division, Pittsburgh.*

Coffee Roasters

One-man operated, compact regional coffee roasting plants are suggested for shipping and labor economy in 4-page illustrated Folder AZ2.—*Jabez Burns & Sons, Inc., 11 Ave. at 43 St., New York City 18.*

Industrial Burners

Complete combustion assemblies for gas firing boilers, air heaters, dryers, ovens and furnaces with a proportional mixing device for burning any low pressure gas are discussed in 6-page foldout. Applications, specifications, and photos are included.—*Bryant Heater Co., 1020 London Rd., Cleveland 10.*

Milk Evaporators

Continuous and batch type milk and ice cream mix evaporators characterized by high heat transfer, high capacity, and ease of cleaning and inspection are detailed in Bulletin 343, which also gives tables of capacities, photos, and drawings of equipment.—*Buflovak Equipment Div., Blaw-Knox Co., Buffalo 11, N. Y.*

Screw Press

A water-cooled hinged-top cage and large diameter barrel are among features of mechanical screw press illustrated in 8-page booklet. Reported are lighter oil, minimum of foots, and increased production.—*The French Oil Mill Machinery Co., Piqua, Ohio.*

Bottle Caser

Nylon brushes case automatically spaced bottles into case pockets in fully automatic bottle caser discussed in 4-page folder.—*Automatic Bottlers Machinery Co., 1419 E. Rosecrans Ave., Compton, Calif.*

Evaporative Condenser

Small capacity (2-8 tons) evaporative condensers with single or multi-circuits, stainless steel sumps, packless and greaseless pumps and extra-large water delivery are subject of Bulletin R162B.—*Kramer Trenton Co., Trenton 5, N. J.*

Water Cooling

"What's Your Cooling Tower I.Q.?" is title of monthly series of question-and-answer folders on water cooling problems. Water distribution, air movement, and facts and figures are treated with illustrations.—*The Marley Co., Inc., Kansas City 15, Mo.*

Condensate Drainage Control

High pressure condensate return systems with data on steam flow conditions and heat exchange characteristics in heating, cooking, drying and pressing operations are covered in Publication 3250. Specifications and drawings of applications are included.—*Cochrane Corp., 17 St. & Allegheny Ave., Philadelphia 32.*

High Vacuums

Information concerning high vacuum apparatus is reviewed in initial number of new illustrated house organ, *Current Data.*—*Distillation Products, Inc., Vacuum Equipment Div., Rochester 13, N. Y.*

Beer Pasteurizer

Hydraulic drive and "walking beam" conveyor design, and a heat conservation system are reported to provide greater efficiency for Vortex pasteurizer covered in Bulletin 87. Plant layout and capacity tables for the pasteurizer are also included in its 16 pages.—*Barry-Wehmiller Machinery Co., 4660 W. Florissant, St. Louis 15, Mo.*

Bread Packaging

Two units of bread, each individually wrapped, then combined in a single package are said to result in greater sales volume. Bulletin DM-559 contains photographs of Duplex machine installations and a picture story of these bread operations.—*Bakery Division, American Machine & Foundry Co., 485 Fifth Ave., New York City 17.*

Liquid Filler

Fluids varying in consistency from apple butter to wine are filled into bottles, cans, flasks or jugs with or without vacuum by adjustable 26-valve filler detailed in 4-page booklet.—*Crown Cork & Seal Co., Machinery Div., Baltimore 3, Md.*

Sifter

Centrifugal dry sifting or wet screening with Turbo-Sifter is reported to result in quiet, dustproof, economical operation. Illustrated 8-page Bulletin 65 gives specifications, photos, and explanation of principle.—*Abbe Engineering Co., 50 Church St., New York City 7.*

Vacuum Pumps

Positive, single-stage rotary vacuum pumps for dry or semi-wet applications are covered with specifications in 6-page Foldout 87.—*Beach-Russ Co., 50 Church St., New York City 7.*

Materials Handling

Sorter

Candies, gum, beans and nuts are among the materials sorted to size ±.003 in. by precision sorter delineated in new information sheet.—*U. S. Engineering Co., 140 Nassau St., New York City 7.*

Non-Skid Conveyor Belts

Illustrated case studies of use of Griptop belts for conveying materials at angles of incline too high for conventional belts are subject of 4-page folder.—*B. F. Goodrich Co., Industrial Products Div., Akron, Ohio.*

Fork-Lift Truck Drive

Magnetic induction drives on gas-powered fork-lift trucks, dispensing with clutches and conventional transmissions, are stated to reduce driver fatigue, prolong tire life, and cut costs of maintenance and repair. Dynatork Drive bulletin covers method of operation and advantages in 12 pages.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Bottle Disposal

All-metal unit for conveying bottles down to another floor and racking them is described and illustrated on information sheet.—*Kenwell Products, Inc., 130 Trowbridge St., N.W., Grand Rapids, Mich.*

Special-Purpose Equipment

More than 110 different adaptations of industrial power trucks, lift trucks, stackers, special platforms and wheel trucks for special applications are included with specifications and descriptive stories in book available through Lewis-Shepard representatives.—*Lewis-Shepard Products Co., 184 Walnut St., Watertown 72, Mass.*

Lift Trucks

Hand lift-trucks in capacities from 1,000 to 15,000 lb., including hydraulic lift-trucks, are illustrated and described in Bulletin 4883, which has chapter on selecting the proper model. Bulletin P476 covers pallet lift-trucks. And electric lift-trucks, pallet trucks and tractors are detailed in Bulletin 4861.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Inclined Belt Conveyors

Two models of portable, inclined, power belt conveyors are pictured and detailed in 4-page Folder RPB-48. Units are used for high level stacking, truck loading, and interfloor or horizontal movement of goods.—*The Rapids-Standard Co., Inc., Grand Rapids 2, Mich.*

Switching Locomotives

Picture story of how diesel-electric locomotives cut switching costs is covered in 24-page pocket-size Booklet GEA-5183.—*Apparatus Dept., General Electric, Schenectady, N. Y.*

Belt Conveyor

Light duty bed belt roller conveyors, detailed in 4-page Bulletin P-A5-1A-2, handle boxes and cartons with variable speeds and easily replaced belts.—*Island Equipment Corp., 27-01 Bridge Plaza North, Long Island City 1, N. Y.*

Balata Belting

Woven cotton duck, impregnated with balata gum and completely pre-stretched, forms belting that is reported to have exceptional strength and moisture resistance. Belting illustrated in 4-page folder is for power transmission, elevating, and conveying.—*Manheim Manufacturing & Belting Co., Manheim, Pa.*

Automatic Dry Blending

Equipment for feeding and proportioning dry or liquid materials in prepared mixes is featured in Bulletin 10.20-F5, which is a reprint from "Food Industries"—*Omega Machine Co., Providence 1, R. I.*

Control Equipment

Combustion Safeguard

Sensitivity to blue light rays emitted by a flame is principle which enables Flame-otrol unit to monitor gas or oil burners. Operation and auxiliary equipment such as strip chart re-

(Catalogs, Bulletins Continued)

Potted Meats are TASTIER when Seasoned by FRITZSCHE

....because they derive their full, savory effects from spice oils composed of pure, carefully standardized essential oils and oleoresins of highest quality and uniformity—the result of more than seventy-five years of practical food flavoring experience. Write for our free pamphlet: "A More Efficient Seasoning Technique..."; also for our latest Flavor Catalog No. F-17. We can supply you a good, economical flavor for practically any flavoring purpose.

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PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

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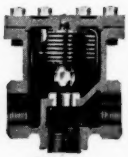
Operate on Lowest Temperature Differential

Repeated comparative tests by large trap users show that Nicholson steam traps operate on lowest temperature differential, and thus prevent waterlogging. Plant records show that, by keeping equipment full of live steam, they have increased production of cooking kettles, for example, as much as 30%. Widely specified for preventing damage to thin gauges. Eliminate "cold blow" in unit heaters. 5 types for every industrial application. Size ¼" to 2"; press. to 225 lbs. BULLETIN 1047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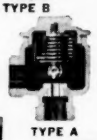
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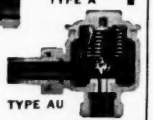
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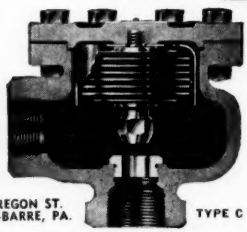
TYPE C

W. H. NICHOLSON & CO. 193 OREGON ST. WILKES-BARRE, PA.

corder are described in 4-page house organ *Wheelco Comments*, Vol. 8, No. 1.—*Wheelco Instruments Co., 847 W. Harrison St., Chicago 7.*

Potentiometers

Tables of various control forms, typical control systems, also style selection tables and other data for the selection of a control system, are included in 31-page catalog on electric potentiometers, No. 15-13. Material covered includes strip and circular chart recorders and controllers, precision indicators, pyrometric switches, and thermocouple and radiamatic assemblies.—*The Brown Instrument Co., Wayne & Roberts Aves., Philadelphia 44.*

Counter

At an operating speed of 1,200 counts per min., electro-mechanical counter provides reliable carryover, can be stacked to six digits, has high visibility, may be remotely controlled, reads out and resets to zero electrically, and alarms at end count. Counter is suggested for production control in Publication 122, which gives specifications and circuit diagram.—*Engineering Research Associates, Inc., 1902 W Minnehaha Ave., St. Paul 4, Minn.*

Plant Supplies

Protective Coatings

Metal, wood, stone, brick and concrete structures and equipment are reported, in 4-page bulletin, to be protected from atmospheric and chemical damage by Perma-Skin vinyl coatings. Characteristics and directions for use are given.—*Dennis Chemical Co., 2701 Papin St., St. Louis 3, Mo.*

Geon in Packaging

Coatings and molded products from Geon latices and resins are featured in 8-page booklet and supplementary sheets. Versatility of vinyl materials is emphasized.—*B. F. Goodrich Chemical Co., 324 Rose Building, Cleveland 15.*

Foil-Printing Ink

A locker plant and cold storage stamp-pad ink for use on foil wrappers is described with directions on illustrated sheet. Ink also stamps on polyethylene, glass, cellophane, waxed locker paper and glassine.—*Time Saving Specialties, 706 New York Life Building, Minneapolis 2.*

Erratum

Address of the Crane Co., maker of piping and plumbing equipment, was mistakenly used in the May FI item, p. 182, reporting the Crane Packing Co.'s release of the bulletin, "Packing for the Chemical Industry." The packing firm's correct address is 1800 Cuyler Ave., Chicago 13.

Color in Packaging

"How to Use Color," fourth in the Little Packaging Library series, details color employment principles for consumer appeal in light of competitive packaging, point of sale environment, and practicality.—*Hinde & Dauch Paper Co., Sandusky, Ohio.*

Aluminum Innovations

Lighter file drawers, a 24-unit Alnesium bottle case, aluminum foil labels for beer bottles, and aluminum delivery and storage containers for meats are featured in No. 30 of house organ, *Aluminum Progress*. Announced also is availability of new colored

(Catalogs, Bulletins Continued)

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VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Sizes—fractional to 87 hp.

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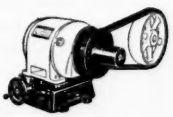

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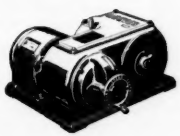

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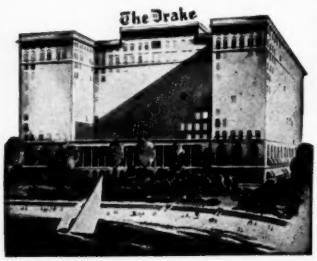

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Catalogs, Bulletins

motion picture, with musical score, on production and uses of aluminum.—*Reynolds Metals Co., 2000 S. 9 St., Louisville 1, Ky.*

Roof Maintenance

Brush or trowel are reported in 4-page folder to be only tools required for resurfacing tin, iron, concrete, slag, gravel, tar paper, or felt roofs with plastic or liquid materials, which are stated to make roofs weatherproof and long-lasting.—*Stonhard Co., 1306 Spring Garden St., Philadelphia 23.*

Label Adhesive

Resistance to weathering, water, acids, alkalis, high and low temperatures, and sudden temperature changes is reported in 4-page folder for clear, permanent, flexible, thermoplastic label adhesive, Dyna-clad 55. Label coating is also suggested.—*The Merchants Chemical Co., Elm Court, Stamford, Conn.*

Steam Hose

Construction of Burstproof steam hose is described and pictured in detail on information sheet. Specifications are listed for this hose, and also other types for less rigorous use. —*The B. F. Goodrich Co., Akron.*

Miscellaneous

Fatty Acid Chart

Constants and compositions of 23 vegetable oils, and all commercially available animal and marine fats and oils are furnished, in Technical Bulletin 77, for use by manufacturers of soaps, detergents and food products.—*Archer-Daniels-Midland Co., 600 Roanoke Bldg., Minneapolis 2.*

Laboratory Equipment

Information on immersion heaters, low-cost analytical balance, varieties of glass, a vacuum pressure regulator, and a water aerator are among features of house organ, *Announcer*, No. 49-3-34.—*E. Machlett & Son, 220 E. 23 St., New York City 10.*

Floor Care

Problems of plant floor care and maintenance are covered in 34-page booklet. Described is equipment necessary and steps to be followed with old and new floors of varied types and compositions, from preparation through sealing and finishing to maintenance. Included is a stain-removal chart.—*Breuer Electric Mfg. Co., 5100 Ravenswood Ave., Chicago 40.*

Ultracentrifuge

Purification and particle-size determination of proteins, viruses, polymers, and other colloids are detailed in 8-page ultracentrifuge booklet. Preparative and analytical models, refrigerated and non-refrigerated, are covered.—*Specialized Instruments Corp., 1238 O'Neill Ave., Belmont, Calif.*

Scaffolds

Castered steel scaffolds made of interlocking tubes are illustrated and described in use in 4-page folder. Reported advantages are safety, adjustability and elimination of fire hazard.—*The Patent Scaffolding Co., 38-21 12 St., Long Island City 1, N. Y.*

Code Marking

For conveyor line use, a rotary marker which automatically dates or codes production runs of cartons and packages is suggested in 4-page folder.—*Industrial Marking Equipment Co., 7 East 48 St., New York City 17.*

—*End*

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IN order to make sure that users will get perfect results *every time* they bake, more and more producers of cake mix—doughnut mix—and similar food products are using Simpson Intensive Mixers to turn out completely blended mixes of unvarying quality. These versatile Mixers, utilizing the proven *mulling* principle of controlled mixing, offer a positive method for processing scores of food products *better, faster, at lower cost.*

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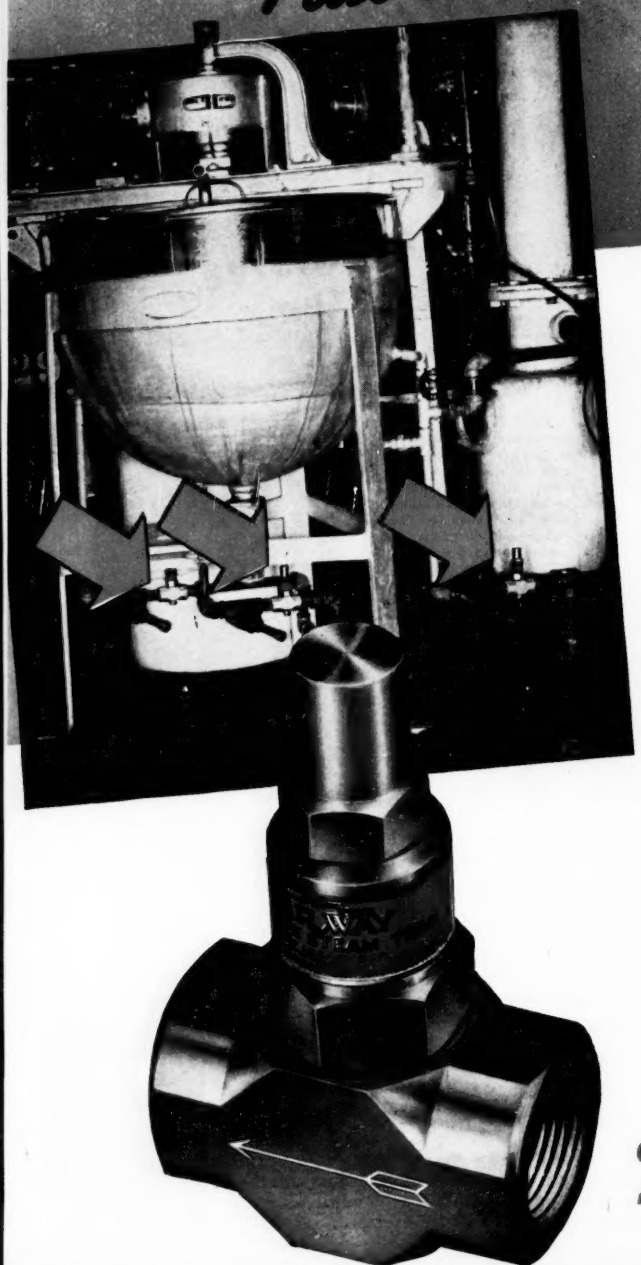

Three little Yarway Impulse Steam Traps do a big job on this steam jacketed kettle, shortening cooking time in the production of apple butter and other fruit products.

The scene is a pilot plant operation at the Eastern Regional Research Laboratory of the Department of Agriculture . . . but the results are the same wherever steam equipment is used. From all corners of the country comes the report—*Yarways get steam equipment hotter, sooner and keep it hot!*

That's because Yarway Impulse Traps discharge *continuously* under heavy loads, while equipment is being brought to operating temperature. Then, under lighter loads, they discharge at short intervals, maintaining peak efficiency.

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YARWAY IMPULSE STEAM TRAP

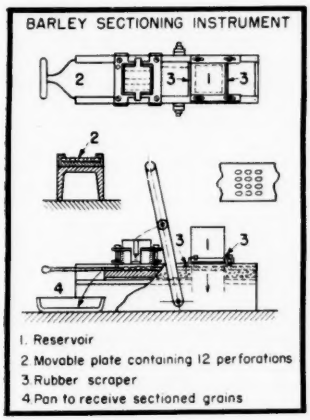
New Technology

CONTROL EQUIPMENT

Sectioning Barley Grains

Indication of the germination capacity of barley seeds can be obtained very rapidly by vital staining with triphenyltetrazolium chloride or bromide. Viable seeds have their germs stained a pink or red color, the depth of which is indicative of the germinative vigor. A sample containing some 300 barley grains should be examined for satisfactory results.

With a slotted plate recessed to hold 12 grains in four rows of 3 longitudinally along the slots, a four-bladed "guillotine" may be used to cut through the grains at one stroke. The instrument carries a reservoir of stained whole seeds at one end. The slotted plate slides under it to receive 12 barley grains in its recesses. When the plate is withdrawn, the grains are arranged in position, if necessary, and then cut through at one stroke. Construction of the instrument is quite simple. See diagram above.



Digest from "Apparatus for Sectioning Barley Grains for the Bio-Chemical Method of Determining Germinating Power," by L. A. Van Gastel and H. Van Veldhuizen, *Revue Internationale de Brasserie at de Malterie, 136-7,* Sept.-Oct., 1948.

QUALITY CONTROL

Vital Stain for Yeast

Use of triphenyl-tetrazolium chloride as a stain to determine the viability of dried bakers' yeast was suggested by the dye's peculiar property of being reduced to carmine-colored formazan by live tissue. Both microscopic and macroscopic methods were investigated. Microscopic examination, using customary stain technics, showed no differentiation between viable and non-viable cells. This was true also of cells in an active state of fermentation with added sucrose.

Of the macroscopic methods, use of the reflection meter to measure difference in color development as related to yeast viability gave the best results. Extraction of the developed color with acetone, and measuring percentage light transmission of the extract with the spectrophotometer was more satisfactory than visual examination, but less so than reflection meter determinations. The latter are regarded as a satisfactory means of determining yeast viability especially in the lower ranges.

Digest from "Triphenyl-Tetrazolium Chloride as a Vital Stain for Dried Bakers' Yeast," by R. E. Morse and W. B. Esselen, Jr., *Food Research,* Vol. 14, 123-30, March-April, 1949.

DAIRY

Retarding Oxidized Flavor In Sweet Frozen Cream

NDGA, in concentrations of 0.00125-0.005 percent (butterfat weight basis), retards development of oxidized flavor in sweetened frozen cream during storage. A similar result is obtained by pasteurization at 170 F. for 15 min. This high temperature results in an objectionable, cooked flavor, however, that is not present in cream pasteurized at 150 F. for 30 min.

To samples of 40 percent cream containing 10 percent sucrose, were added NDGA (as a 15 percent solution in propylene glycol) in quantities sufficient to give concentrations of 0.00125 and 0.005 percent, and, in most cases, $CuSO_4$ to produce 5 ppm. Cu. The cream was pasteurized, cooled to 40-45 F., sealed in 30 ml. tinned cans and stored at —12 to —20 F. Samples were removed monthly and thawed for 25 hr. at 40 F., then examined for oxidized flavor. Each sample was held 1 week at 40 F. and again examined.

At the end of 10 months, oxidized flavor was not apparent in any of the samples containing 0.005 percent NDGA. In samples of low quality cream no oxidized flavor had developed in 12 months frozen storage plus the 1 week at 40 F. However, the flavor had developed in samples of high quality cream containing the lower concentration of 0.00125 percent NGDA within 8 months.

Digest from "A Study of the Use of the Antioxidant Nordihydroguaiaretic Acid in Dairy Products. III. Its Antioxygenic Properties in Sweetened Frozen Cream," by J. W. Stull, E. O. Herreid and P. H. Tracy, *Journal of Dairy Science,* 301-5, April, 1949.

CEREAL PRODUCTS

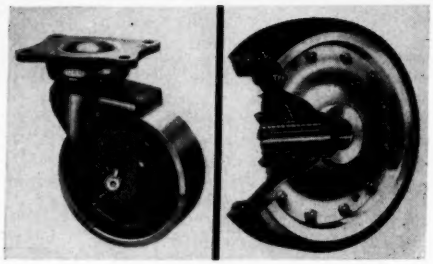
Soybean Protein

Improved protein isolation from soybean meal is the object of a recently patented process. Most of the protein is removed mechanically at its isoelectric point. The remainder is extracted from the fibrous residue under alkaline conditions. Oil-free soybean meal is soaked in water acidified to the isoelectric point of the protein, and the slurry is passed through a buhrstone mill. The mill discharge is passed over a screen through which the protein particles fall, while the fibrous residue remains. The latter is then leached with alkali and filtered, the filtrate being acidified to precipitate the protein which is recovered.

(New Technology Continued)

INDEX TO ABSTRACTS

CONTROL EQUIPMENT
Sectioning Barley Grains 159
QUALITY CONTROL
Vital Stain for Yeast 159
DAIRY
Retarding Oxidized Flavor in Sweet Frozen Cream 159
CEREAL PRODUCTS
Soybean Protein 159
Milling Grain by Impact 160
MEATS
How Processing Affects Chicken Meat Products 160
Rancidity in Bacon 162
BAKING
Quality of Frozen Cakes 162
FRUITS AND VEGETABLES
Bottled Rhubarb Juice 164
SUGARS
Invert Sugar 164
Confectioner's Syrup 166
FERMENTATION
Bottling and Pasteurizing Beer 166
DEHYDRATION
Drying Eggs 168
Dehydrated Scrapple 168
MISCELLANEOUS
Secondary Plant Foods 170



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The two fractions of protein may be combined any desired proportion. The goal is a protein not excessively denatured, capable of giving dispersions of good color, high adhesive and cohesive strength, and low viscosity in alkaline media.

Digest from U. S. Patent 2,460,627, issued Feb. 1, 1949, on an application dated Sept. 7, 1946, to E. O. Erkko, Wilmington, Del., and R. T. Trella, Kalamazoo, Mich., and assigned to Hercules Powder Co.

Milling Grain by Impact

Substitution of high-velocity, fling-impact apparatus for the conventional differential rolls used in milling flour and other grain products is the novel feature of a recent patent. Design of the impact apparatus is such as to give grain particles a true centrifugal fling, as contrasted with apparatus having primarily beater functions. Advantages of fling-impact grinding as compared with differential rolls are: Lower installation, power, and maintenance costs; more efficient breaking and separation of endosperm, hull and germ parts; greater percentage of comparatively pure endosperm particles of more uniform classification and shape; and more uniform reduction in each successive grinding step.

Digest from U. S. Patent 2,464,212, issued March 15, 1949, on an application dated Feb. 10, 1944, to R. J. S. Carter and H. McDonald, Minneapolis, and assigned to Pillsbury Mills, Inc.

MEATS

How Processing Affects Chicken Meat Products

Investigation has been made of the effects of cooking, canning, freezing, curing and smoking processes on the content of amino acids and certain B vitamins in chicken meat. Seven samples, of four birds each, were used in the tests: One for determining amino acids and vitamins in fresh muscle tissue; a second for investigating the nutritive value of chicken meat protein; a third for studying the effect of cooking; and the four remaining samples for processing to represent commercial packs in glass and tin, as well as smoked and cured, and frozen meats. Procedure and results are given in detail.

No significant loss of riboflavin occurs as a result of any of the processes. Substantial losses of thiamin occur with all methods of processing, the loss being a function of both time and temperature. No appreciable loss of nicotinic acid occurs in any of the processes, except curing and smoking.

Determinations of nine amino acids showed good retention in chicken meat

(New Technology Continued)

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Many other makers of national brand merchandise know the Union shield on a box means it is made by the leader in Kraft packaging, operating five of the world's largest paper machines in a completely integrated pulp-to-container plant. Linked with this great plant are tremendous forest resources and four modern box plants—and one management with one high standard of quality control supervises everything from timber to finished box.

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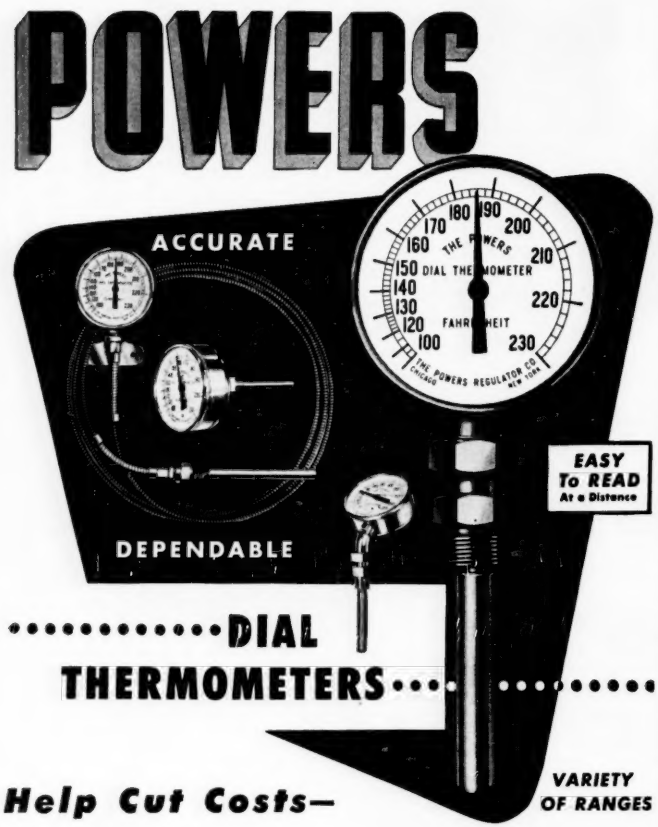

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For more accurate temperature readings and improved efficiency use POWERS Dial Thermometers. They're vapor pressure actuated. Have 4" dials with either rigid stem for use in pipe lines and tanks or flexible tubing type for conveniently showing the temperature at a remote point. For further information and prices phone or write our nearest office. Offices in 50 cities. Over 55 years of automatic temperature control.

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after various methods of processing, except for tryptophane. Destruction of this amino acid was uniform in all portions of the meat, regardless of the method of processing.

Digest from "Vitamin and Amino Acid Content of Processed Chicken Meat Products," by Ricardo Millares and C. R. Fellers, *Food Research*, Vol. 14, 131-43, March-April, 1949.

Rancidity in Bacon

Causes of deterioration of bacon in storage have been studied by determining the peroxidation and carotene-bleaching activity of hemoglobin-free extracts of cured bacon fatty tissue, and comparing the results with those obtained in similar studies of hemoglobin solutions. Peroxidation activity was investigated for effects of concentration of hemoglobin and heat, and carotene-bleaching activity for effects of pH, concentration of hemoglobin and carotene, time, heat, and poisons.

It was found that hemoglobin activity is not influenced by boiling, but that there is a heat-labile factor in hemoglobin-free extracts. The evidence indicates that there are at least two factors in bacon adipose tissue and its extracts capable of producing fatty acid peroxides and bleaching carotene. One of these is probably hemoglobin, although its concentration in adipose tissue has not been determined.

Digest from "Peroxidizing and Carotene Bleaching Substances in Bacon Adipose Tissue," by Raymond Reiser, *Journal of the American Oil Chemists' Society*, Vol. 26, 116-20, March, 1949.

BAKING

Quality of Frozen Cakes

Butter- and sponge-cakes baked before freezing both maintain good quality throughout long periods of storage at 0 to −5 deg. F. However, unbaked batters for the two types of cakes exhibit differences after frozen storage. Butter cakes from frozen batter stored up to six months and thawed to room temperature before baking were practically equivalent to fresh cakes. Butter cakes baked from frozen batter without thawing were good throughout 7 months of freezer storage, but were slightly more compact, smaller in volume and humped rather than rounded in shape.

Sponge cakes baked from frozen batters were not satisfactory, especially when the batter was allowed to thaw before baking. The foam broke during thawing resulting in a heavy, soggy cake of poor volume. When baked with-

(New Technology Continued)

"Give us the tools..."

YOUR ONLY CHANCE of Getting Ahead

Where is the "brave new world" so glowingly promised us by the politicians during and after the war? We were told then that postwar America would live 50% better than it had before. Why has that promise faded out? Why are men today discouraged and frustrated?

We have not yet made good 1944's promises because the *American worker turns out no more in an hour now than he did in 1941.* We are getting more total production in our country – but only because we have more people working. Not because each one of us is producing more. American industry's ability to turn out more and more goods – with less of each worker's time and effort – has been stymied for eight long years.

Progress has been blocked because in some cases workers have not been willing to work as hard as they did before the war. In other cases unions restrict the use of labor-saving machines and methods. In some places obsolete building codes and ordinances prevent advances. In still other cases progress has been blocked by collusive practices between unions and manufacturers or operators.

But the biggest block to progress is the fact that our industry in the United States has been unable to provide our workers with all the new tools and equipment that they need.

Increasing productivity – that is, each one of us turning out more in each hour of work – is the key to higher living standards. Productivity depends directly upon the kind of tools workers use. His tools, more than anything else, determine how much a worker can turn out; and what his paycheck will buy depends in large part on what he turns out—not on how long or how hard he works.

Look what happened in our country in the forty years from 1900 to 1940. Productivity of the United States *more than doubled.* It doubled because:

Business investment in capital equipment gave workers new tools—tools that had three and one-half times as much power—

So—Americans' living standard rose almost 50% while the average work week was dropping from 61 to 43 hours.

Industry did continue to raise its output per man hour, even in the depressed 1930's. But it did it because, with unemployment widespread, companies used only their most efficient equipment. *Actually the great depression saw industry fall far behind in the job of providing workers with new tools.*

Then came World War II. Few new tools for peacetime industry were produced. *As a result of depression and war, the U.S. fell behind in needed investment in new industrial facilities by more than $100 billion.*

Since the war business has spent almost $60 billion for new plants and equipment –

But the greater part of that money went to *expand* production to take care of the needs of our bigger population, and to *replace* plants and equipment that were worn out and ready to be junked at the end of the war.

continued on next page

Only a small fraction of the $60 billion went to *modernize equipment* – the equipment that increases efficiency and improves productivity of the individual worker.

Right now industry is desperately trying to do the job of increasing efficiency of machines so that each worker can turn out more.

McGraw-Hill's national survey of Business' Needs for New Plants and Equipment shows that manufacturers plan right now to spend in the 5 years ahead three-quarters of their capital funds to replace and modernize facilities. The biggest part of the more than $55 billion industry plans to spend on its plants and equipment will go directly to improve efficiency of the individual.

If industry can carry through its plans – and expand them as it would like to and as it must do – the U. S. can catch up on its depression-war-time lag in progress within a few short years.

If American industry is allowed to earn the money to buy the equipment, it can raise the American standard of living 50% in our generation – in the next 25 years. No other nation can promise its people that much – and deliver on the promise.

But the promise can only be fulfilled by American industry. Wherever you turn, industry has dramatic new ways of doing things. Using oxygen by the ton, steel makers are increasing production from blast furnaces by 20%. New high-speed machine tools are doing three times the work of 1940 tools. A new coal-mining machine will multiply a miner's daily output 10 times. Diesel locomotives do the work of three steam locomotives on many jobs.

New products – and larger production of standard products – are already making their impact on American life. Two million Americans will get new television sets this year. Automatic washing machines, electric dishwashers, and home freezers are easing the daily tasks of thousands of housewives. Millions of homes that did not have them before the war now have telephones, automatic heat and refrigerators. Frozen foods, nylon clothing – these and many other things coming along now – will shape the *real* new world for Americans.

But industry can provide them only if it can keep on investing at least $15 billion a year now – and more in future years – in new plants and equipment.

Today Washington is taking a course which, if pursued, will make that investment by industry impossible. Government spending now strains our resources to the limit, and more multi-billion dollar spending proposals are being piled on. *But government spending cannot improve American living standards.* It never has, and it never will. Increasing government spending *now* will only block progress, because the government proposes to pay for its plans by taxing away the profits industry is using, and must continue to use, to improve and expand its plants and equipment – our only hope for greater worker productivity and higher living standards.

Better living can only be paid for with more production. And we can only get more production by increasing productivity – by each one of us producing more for each hour of work.

The first thing is to get the production – in peace and in war – for better living – for security. Industry is planning to provide it – and is using $13 billion of its profits this year to improve and expand its facilities.

The only sensible, the only safe national policy is to make it possible for American industry to do its job – not to terrorize private industry with proposals of ruinous taxation and paralyzing controls and threats of nationalization. For American industry is not a thing apart from the American people any more than is government. American industry is the lifeblood of the American people and whatever makes industry do its work better contributes more to the common welfare than a bureaucratic government can ever hope to do.

President, McGraw-Hill Publishing Company, Inc.

Only cellophane gives you so much for your packaging dollar

The protective qualities needed to keep baked goods at their best are engineered into Sylvania Cellophane types MS and DS.

Their true transparency offers extra visibility, beauty and sales appeal. They resist grease . . . keep your product oven fresh and free from contamination. Their uniform strength and heat sealing qualities mean easy application either by hand or by automatic equipment.

The Sylvania representative will help you determine the right combination of properties needed for your products. Talk over your packaging problems with him or write to Market Development, Dept. F-7, for information mentioning the specific application in which you are interested. You will find us most cooperative.

Printed cellophane makes a stand-out cup cake package. 2 cakes on a board plus smartly designed over-wrap adds up to a package that assures freshness and top sales appeal.

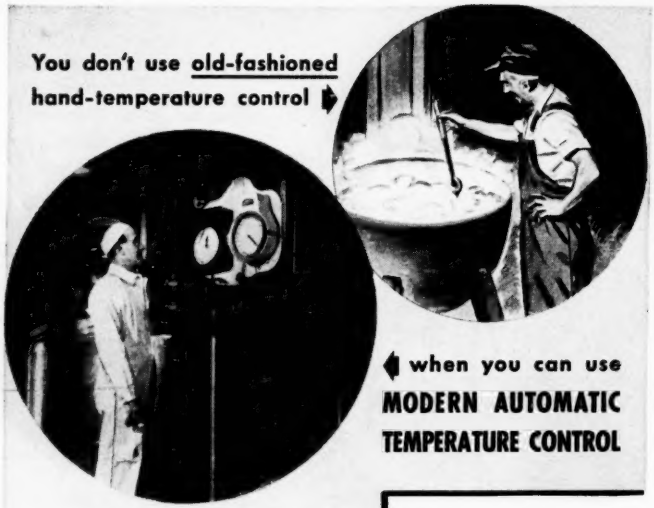
SYLVANIA CELLOPHANE

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 350 Fifth Avenue, New York 1, N. Y. *Plant:* Fredericksburg, Va.

You don't use old-fashioned hand-temperature control



when you can use MODERN AUTOMATIC TEMPERATURE CONTROL

Why use Old-Fashioned Spice-Flavoring Methods when you can use

MM&R SPICE OILS, the MODERN Method of FLAVOR CONTROL

In flavoring food products, the elements of chance and human error are reduced to a minimum through the use of modern, concentrated liquid spice Essential Oils.

Only Spice Essential Oils offer positive uniformity and purity . . . plus important economies in storage, shipping and handling.

A glance at the panel to the right will reveal many more important reasons why a growing number of progressive manufacturers are switching to Spice Essential Oils . . . the MM&R brand . . . pace-setter in the field of Spice Oils for the food industry.

11 Reasons why you should use MM&R SPICE ESSENTIAL OILS

1. Uniformity of quality and flavoring
2. No color disturbance
3. Less bulk in storage
4. Less weight in shipping
5. No danger of molding
6. No loss by exposure in package while being stored
7. Free from bacteria
8. Ease of handling
9. Less cost as compared to equivalent spice value
10. Entire flavor available immediately
11. Elimination of the possibility of dust and dirt

Send for complete information and "Table of Equivalents" showing comparative flavoring strengths of whole spices and spice oils.

MAGNUS, MABEE & REYNARD, INC.

SINCE 1895 . . . ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 DESBROSSES STREET, NEW YORK 13, N. Y. • 221 NORTH LA SALLE STREET, CHICAGO 1, ILL.

LOS ANGELES: BRAUN CORP. • SEATTLE, PORTLAND, SPOKANE: VAN WATERS AND ROGERS, INC.
SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

out thawing, a satisfactory cake was produced during the first month of freezer storage although it was coarser grained and of smaller volume than fresh baked cakes.

Sponge cakes which were baked from frozen batters began to have an off-flavor after 1 month of freezer storage. After 3 months the flavor was so objectionable that the cakes were inedible. The flavor was variously described as metallic, bitter or terpene-like. A similar flavor was first detected in butter cakes baked from batters stored for 6 months. Suggested cause of the off-flavor is an oxidative deterioration of the egg yolk lipids.

Digest from "Research Shows Difference in Frozen Butter Cake and Sponge Cake," by B. Meyer, R. Buckley and R. Moore, *Refrigeration Engineering*, 340-42, 388-92, April, 1949.

FRUITS AND VEGETABLES

Bottled Rhubarb Juice

Sterilized rhubarb juice that has a clear rosy color and the taste of cooked rhubarb, is the object of a recently patented process. Rhubarb stems are ground to a fine consistency, allowed to stand 2-3 hr. and pressed to extract the juices. Juices are cooled to near freezing, held for many hours to clarify by sedimentation, decanted, treated with milk of lime to raise pH, and held near freezing to precipitate oxalic acid salts. The juice is again decanted, then sweetened, pasteurized, and bottled. Bottled juice is steam sterilized.

Digest from U. S. Patent 2,459,901, issued Jan. 25, 1949, on an application dated Oct. 14, 1944, to O. C. Stout, Hamilton, Ohio.

SUGARS

Invert Sugar

Bentonite, which has hitherto been used in small quantities for the clarification of raw sugar solutions, has been found effective in promoting inversion of sucrose when used in larger quantities and under certain conditions. The process, described in a recent patent, can be carried out by percolation or agitation. In either case the bentonite is granulated to the desired size and calcined. The sugar solution is heated to between 150 and 200 F. In percolation, the ratio of sugar solids to bentonite should range between 2 and 10 to 1, and the time of contact should maintain a space velocity up to 1.5 volumes of sugar solution per volume of bentonite granules per minute. In agitation, the time of contact will vary from a few minutes to

(New Technology Continued)

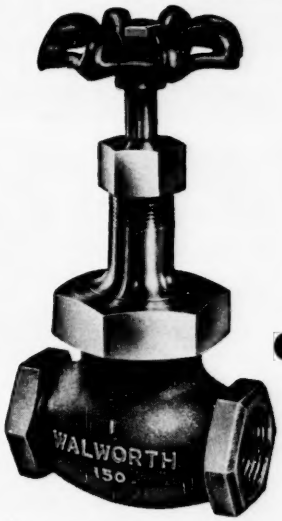
Toothed Lock Washer: Prevents loss of stem nut due to vibration, thereby holding the handwheel securely.

Newly Designed Handwheel: Air-cooled, finger grip handwheel affords sure grip even with greasy gloves.

Improved Packing: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure.

Hexagonal Union Bonnet Connection: Eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and assembled.

WALWORTH



IMPROVED

No. 95 BRONZE GLOBE VALVE

also available in Angle Type (No. 96)

The service ratings of the Walworth No. 95 are 150 pounds per square inch steam at 500F, and 300 pounds per square inch non-shock cold water, oil, and gas. In the manufacture of this quality bronze valve, more than 47 gages are used in machining parts to micrometric accuracy, thus insuring interchangeability of parts. For further information see your local Walworth distributor, or write: Walworth Company, 60 East 42nd St., New York 17, N. Y.

note these 7 Great Features

WALWORTH

valves and fittings

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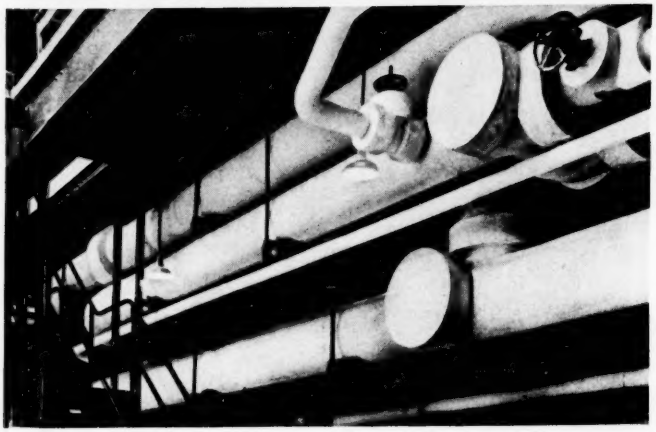
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

New Cylindrical Disc Holder: The design of the top portion of the disc holder keeps the disc accurately guided under all operating conditions.

Renewable Asbestos Disc: This disc is suitable for steam up to 500F and is resistant to oil, gasoline, and many chemicals at atmospheric temperatures. Discs for special services are available.

Extra Strong Body: Made of Composition M (ASTM B61) bronze thick enough to provide a high safety factor. Valves undergo hydrostatic shell test of 450 psi.

The easy, practical way to cover insulated surfaces



Sewing the canvas — or applying metal strapping — these time-consuming operations are no longer necessary. The canvas, asbestos, fiberglas or other non-conductor can be securely bonded with Arabol Lagging Adhesive.

This adhesive dries in 4 to 6 hours; *leaves a sized finish on the lagging material* . . . the job is completed. No paint need be used on this sized finish, unless you prefer to add one coat for appearance. Maintenance is simplified — grease, oil, soot and dirt wash off easily. And the adhesive is vermin-proof . . . fire-retardant, too.

Arabol Lagging Adhesive has successfully passed rigorous tests by independent laboratories. The results show that it retains its adhesive powers despite exposure to extreme temperatures, to immersion in water and to live steam.

Write us today for detailed facts and figures. Don't place open specifications on lagging work — ask for Arabol Lagging Adhesive. You can depend on it to fill your most exacting requirements for both utility and appearance. Also, ask about our cork cement for adhering cork to cork on refrigerator lines.

THE ARABOL MANUFACTURING CO.

Executive Offices: 110 East 42nd St., New York 17, N. Y.

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Adhesives?... ARABOL!

an hour, depending on the concentration of bentonite. For maximum inversion efficiency it is desirable to use clarified sugar solutions.

Digest from U. S. Patent 2,461,163, issued Feb. 8, 1949, on an application dated March 13, 1946, to W. A. La Lande, Jr., Upper Darby, Pa., and assigned to Attapulgus Clay Co., Philadelphia.

Confectioner's Syrup

Non-crystallizing syrup made from molasses and sucrose, which is as effective for sweetening as sucrose, can be prepared by a patented process. Cane molasses is diluted with water to a concentration of 15 to 20 percent total solids, treated with activated carbon or a bleaching agent, and filtered. Sucrose is then dissolved in the molasses until the mixture has about 50 percent total solids. Mineral acid or an enzyme are used to invert all but 10 to 15 percent of the sucrose. Then, additional sucrose is added to about 75 percent total solids. Preferred final proportions are 5 percent non-sugar solids, 40 percent inverted sucrose, and 30 percent non-inverted sucrose.

Digest from U. S. Patent 2,459,991, issued Jan. 25, 1949, on an application dated Dec. 13, 1944, to Clarence C. Copdevielle, New York City.

FERMENTATION

Bottling and Pasteurizing Beer

Beer becomes more susceptible to infection by wild yeasts after the primary yeast is filtered out. Sterile filtration is difficult to achieve without removing colloids that contribute to body and foaming qualities. Pasteurization renders the beer microbiologically stable, but may contribute cooked or "bready" flavors to light and pale beers, although darker stouts and brown ales may be improved. However, chill haze formation is favored by heat treatment.

The development of turbidity and off-flavors following pasteurization are oxidative and are promoted by air in the bottles. They can be minimized by the addition of 40-50 ppm. of SO_2 to reduce somewhat the oxidation-reduction potential of the beer. On the other hand, the "sun" or "skunky" flavor of beer that has been exposed to bright sunlight is associated with a very low oxidation-reduction potential. Very low as well as very high oxygen contents may thus be detrimental to flavor and stability. There may well be an optimum pH for flavor retention.

Effective beer pasteurization de-

(New Technology Continued)

JAMISON-BUILT DOORS

For Use in Zero° F. and Below

TO MEET YOUR SPECIFICATIONS

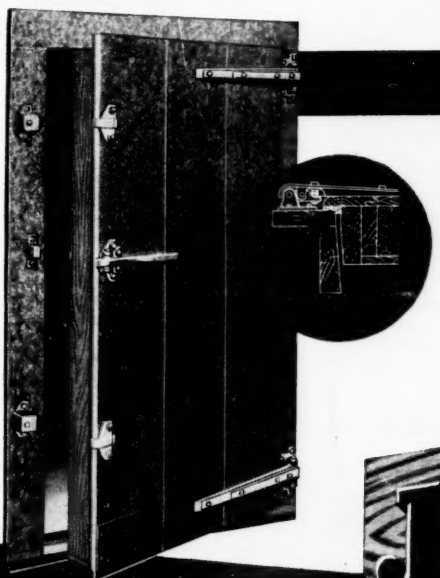
SUPER FREEZER DOOR

Time Proven Overlap Type

The Super Freezer Door made industrial use of sub-zero temperatures practical. Overlap type of construction permits insulation to any desired thickness. The sealing and insulation efficiency of its 4" wide by ⅝" thick, resilient, moisture impervious gasket is exceptional. The unusually strong hardware of special design, supplied as standard equipment on the Super Freezer Door, is largely responsible for its outstanding performance.

Hinges are: Jamison Adjustable Spring Hinges (Pat. No. 1987512). Fastener: Jamison 031 (single point) Roller Fastener (Pat. No. 2083458).

For only slight additional cost Jamison E-Z-Open (Two-Point) Fastener as illustrated (Pat. No. 2147794) will be furnished. Warm side (Front or Back) of Super Freezer Door is covered with No. 20 gauge galvanized steel forming effective vapor barrier and eliminates possible deterioration due to moisture precipitation.



LO-TEMP DOOR

Infitting Type for Low Temperature Use

A single cellular rubber gasket encased in a moisture impervious skin provides the perfect plug-plus-surface seal. Uniform gasket compression is assured by Jamison E-Z-Open (Two-Point) Fastener (Pat. No. 2147794) in combination with Jamison "Adjustoflex" Hinges, (Pat. No. 2208310). To eliminate possible deterioration due to moisture precipitation the top of door is equipped with a metal cap—front, edges and casing are covered with No. 26 gauge galvanized steel sheet. The Lo-Temp Door satisfies the demand for a door of the infitting type for use in temperatures as low as minus twenty (—20°) Fahr.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

The ONE Conveyor Belt for Every Process . . .

LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

If your process is canning, pickling, preserving, dehydrating, cold packing or hot packing, a La Porte Belt is the most efficient and economical belt for you. Its rugged steel construction resists impacts, wear, heat, cold and rust. It is easily sterilized with steam or scalding water. It will not stretch, creep, weave nor jump. And its open mesh feature, that permits circulation of water, air or heat around products in process, makes it readily adaptable to scalders, washers and cookers.

The flat, even surface safeguards and speeds up handling of tin, glass or paper containers as well as corrugated shipping boxes. It is long wearing and requires little maintenance. Available in any length and practically any width. *Write at once for literature and price—no obligation.*

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

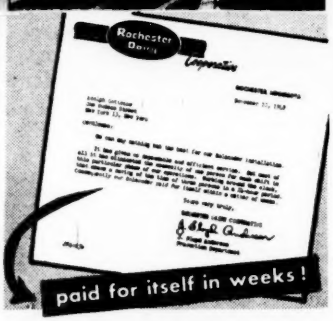
ROCHESTER DAIRY *Saves*
24 man-hours every day with a
ROLACODER*
CASE-MARKING ATTACHMENT

Add Rochester Dairy Cooperative to the list of plants that have replaced costly hand-stamp marking with a labor-saving ROLACODER. A small, precision-engineered attachment, the ROLACODER is easily installed on a case-sealer or conveyor to imprint cases automatically as they travel the line. Makes sharp, permanent marks of code-dates, lot numbers, varieties, trademarks, etc. from quickly interchangeable type or special dies. Friction-operated, self-inking. Models for located or continuous marking.

Request descriptive Data Sheet 6.0

* Pat. Pending

Representatives throughout U. S. and Canada



MAGI-MATIC
ADOLPH GOTTSCHO, INC.
MACHINES TO MARK WHATEVER YOU MAKE
191 Duane St. New York 13, N. Y.

pends on the kinds of organisms present and on their numbers. Badly infected beer cannot be pasteurized by the usual temperatures and time—135-140 F. for 30 min. or 140-145 F. for 20 min. Cans reach pasteurization temperature more quickly than bottles; 16 min. for cans against 27 min. for bottles immersed in water at 140 F.

Breakage of bottles during pasteurization is often due to high pressures that develop when head-space is insufficient. Beer expands about 2 percent on heating from 32 to 151 deg. F. A 450 ml. bottle, filled at 32 deg. F. and heated to 151, will have an internal pressure of 74 psi. if the head-space 15 ml. at filling, but 650 psi. if the head-space is only 9.5 ml. About 3 percent of total capacity should be allowed for headspace. With good bottles and ample time for heating and cooling, breakage should not exceed ½ percent, though this may be slightly higher for new bottles.

Digest from "Bottling" by H. Lloyd Hind, *Journal of the Incorporated Brewers' Guild*, Vol. 35, No. 413, 107-13, March, 1949.

DEHYDRATION

Drying Eggs

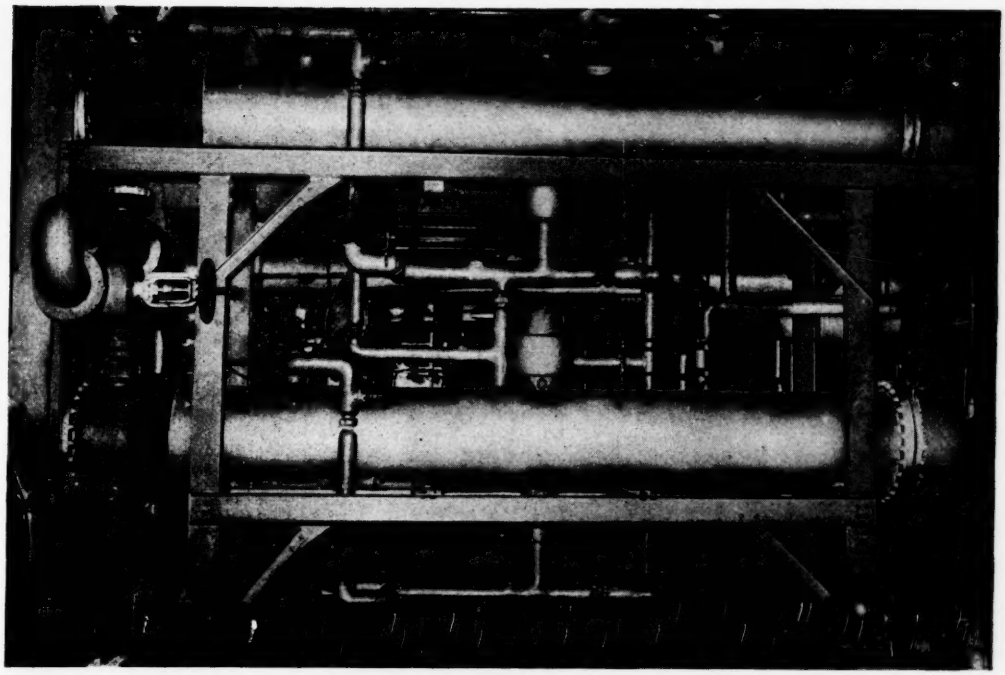
Acidifying or pasteurizing the raw material is unnecessary in the preparation of dried egg products by a recently patented process. Believing that off-flavors and odors in dried egg products are due to the presence of reducing sugars, the inventors remove the reducing sugars by fermenting the egg liquids with bakers' yeast, and drying the fermented mixture. Inoculation of whole liquid eggs with 0.18 percent by weight of moist yeast depleted the sugar in about 4 hr. Fermentation causes little, if any, change in acidity, so that the process can be carried out at a pH near the neutral point, thus eliminating neutralization.

Digest from U. S. Patent 2,469,986, issued Feb. 8, 1949, on an application dated Dec. 21, 1944, to G. Josh, Crown Point, Ind., L. A. Harriman, Chicago, and E. W. Hopkins, Hinsdale, Ill., and assigned to Armour and Company, Chicago.

Dehydrated Scrapple

Preservation of palatability, nutritive value, and vitamin content, and rapid rehydration are advantages claimed for a recently patented method of making dehydrated meat scrapple. The natural effectiveness of corn meal in preventing rancidity in the meat fat is greatly augmented by the addition of soy flour and other antioxidants, such as tocopherols, ascorbic

(New Technology Continued)



K&M "Featherweight" 85% Magnesia Insulation is used on piping and heat exchangers in this compressor room.

Heat...and cold cash...conserved by

K&M *"Featherweight"* 85% MAGNESIA

Basic Carbonate of Magnesia is combined with Asbestos Fibre in K&M "Featherweight" insulation. Its use on steam pipes and throughout heat exchanger systems is supplying particularly good proof of a whole series of economies that users enjoy...

(1) The highly effective insulation *piles up fuel savings.*

(2) Extreme lightness and easy application *cut installation costs.*

(3) Lasting strength and efficiency mean *freedom from maintenance.*

All this is being demonstrated all the time, in process plants, power plants and on other industrial applications where the heat-saving responsibility belongs to K&M "Featherweight".

You can get K&M "Featherweight" 85% Magnesia in all standard sizes. It is designed for temperatures up to 600° F.

There are K&M Distributors at strategic points throughout the country. They are experts on the application of this and all the other K&M insulation materials. One of them near you can help to make insulation more useful and profitable to you. Or write us.

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

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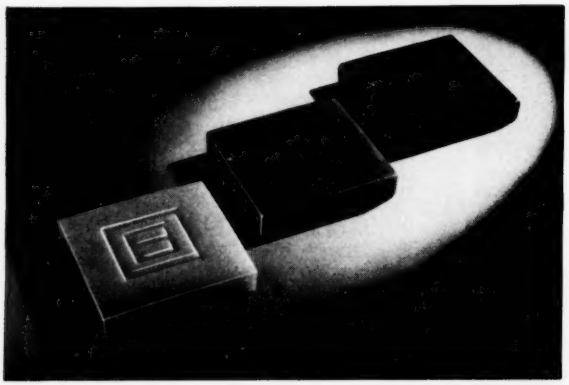
THE PRODUCT.. WAX



BARECO'S TOP-RANKING SALESMAN

Careful experimentation . . . research . . . experience . . . plus extensive study and analysis of the wax application problems faced by the food and drug industries — these factors have consistently kept Bareco Microcrystalline Wax the leader in its field. The Bareco Oil Company has been manufacturing these famous waxes for many years and their successful use in a multitude of food and drug packaging applications has been checked and rechecked. That is why when a microcrystalline wax is needed so many buyers . . . LOOK TO BARECO.

BARECO maintains a staff of trained personnel to analyze new wax problems and to help solve questions in the wax application fields. Samples of Bareco Microcrystalline Waxes and more detailed information will gladly be sent to you upon request.

- HIGH WATER VAPOR RESISTANCE
- EXCELLENT HEAT SEALING CHARACTERISTICS
- HIGH MELTING POINTS
- EXCELLENT ELECTRICAL CHARACTERISTICS
- CHEMICALLY INERT

BARECO OIL COMPANY

Dept. F — Box 2009
TULSA, OKLAHOMA

Dept. F — Widener Bldg.
PHILADELPHIA, PA.

acid, and gum guaiac or mixtures of them.

For example, soy flour is incorporated in ground meat and steam-heated. Water is added and the mixture brought to a boil. Corn meal and seasonings are added, thoroughly stirred, and boiled until the mixture thickens. It is then poured into molds, cooled, sliced, and dehydrated for seven hours at a temperature of 155 F. The product is ready for packing, but it may be compressed to increase its density. It may be eaten dry, or rehydrated and prepared in the usual manner.

Digest from U. S. Patent 2,457,063, issued Dec. 21, 1948, on an application dated Dec. 5, 1944, to A. F. Morgan, Berkeley, Calif., and B. M. Watts, Pullman, Wash., and assigned to the United States of America.

MISCELLANEOUS

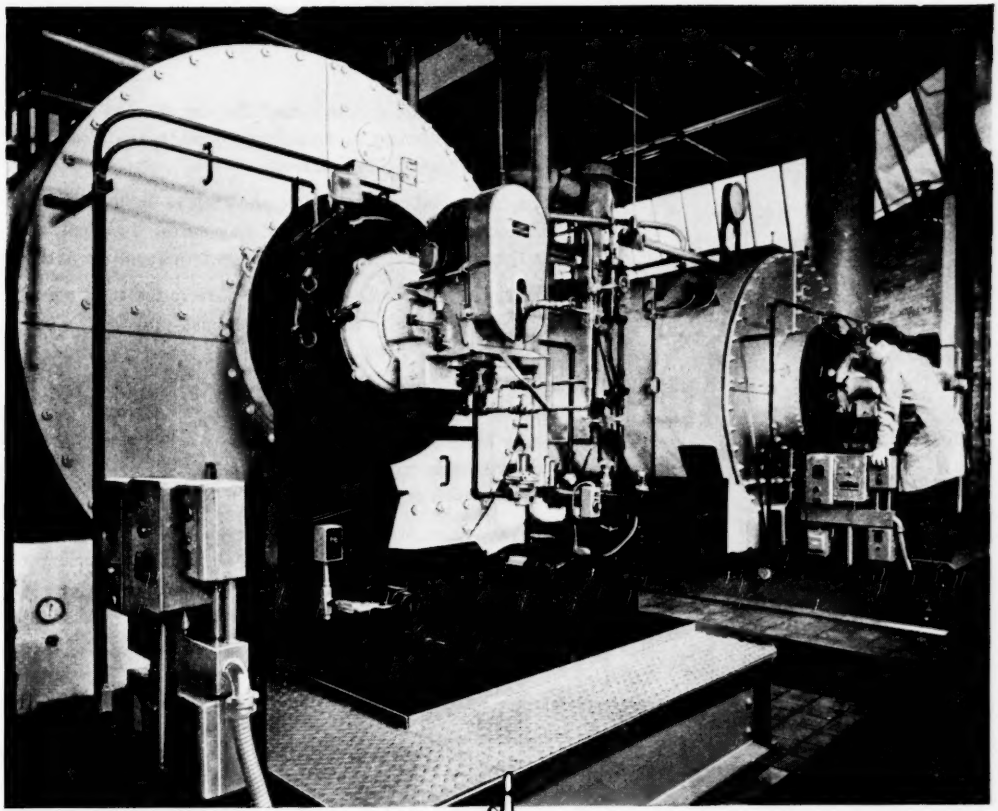
Secondary Plant Foods

Variety of food is just as essential for plants as for people, and failure to recognize this fact may soon imperil the nation's economy through widespread crop failures. The desire to obtain high crop yields is leading the farmer to use more and more of the fertilizer stables—nitrogen, phosphorus and potassium—and to overlook the established need of secondary and micronutrients such as manganese, copper, boron, and zinc. Intensive farming removes these natural plant foods from the soil, and unless the deficiency is corrected it will result in crop losses. A program of education must be undertaken to remedy the condition.

Restoration of micronutrients to the soil can be accomplished by one of three methods. First, make the materials available to the farmer but do not incorporate them in the regular grades of fertilizers. This would require that the farmer make an extra trip over his land, but may be the best method in the pioneering stages of the program. Second, manufacturers may add to their standard grades a prophylactic dose of a "shot gun" mixture of secondary plant foods, but little benefit is likely to result from such an unscientific program. Third, certain standard grades of fertilizers could be made available with sufficient and guaranteed amounts of micronutrients incorporated in the mixture. Such a program would have to be backed by extensive research and by recommendations from experiment stations in order to limit number of grades.

Digest from a paper presented by George H. Serviss at the 114th national meeting of the American Chemical Society, Washington, D. C., Sept. 1, 1948.

—End



Never Forget

BOILERS BURN DOLLARS . . .

Yes — generating steam costs money — money for fuel, boiler operation, care and maintenance. An old or outmoded fuel-wasting boiler can burn many hidden dollars through excessively high steam costs.

It's sound business to install boilers that give you the most for your steam dollars — modern, guaranteed high efficiency Cleaver-Brooks boilers, using oil or gas as fuel.

For any boiler installation (15 to 500 HP.)—new or replacement—Cleaver-Brooks offers these immediate and long-range cost-saving advantages:

A Custom-Planned Boiler Engineered for Your Needs: Your steam needs and steam-using equipment are studied — your present steam load plus your estimate of future expansion are considered — with this information the size of Cleaver-Brooks Boiler best suited to your specific needs is determined.

Factory Starting Service: Your boiler is placed in operation by Cleaver-Brooks factory service-engineers. Your operators are trained in operation, care and maintenance.

Flexible Operation Burning Gas or Oil With Equal Efficiency: You can use oil, gas, or combination oil and gas, whichever is of lower cost. Through their high heat transfer, Cleaver-Brooks boilers operate at a guaranteed efficiency of 80% from full load down to 30% of rating.

In addition, Cleaver-Brooks boilers give you clean, smokeless operation — eliminate fuel and ash handling — require no high or costly stacks — no special foundations — fit under low headroom — provide quick steaming, flexible operation to meet fluctuating loads — fully meet all codes.

Available in sizes 15 to 500 HP., 15 to 200 P.S.I. — write for Cleaver-Brooks steam boiler bulletin.

CLEAVER-BROOKS COMPANY
352 E. Keefe Ave., Milwaukee 12, Wis.

WRITE on your business letterhead for Steam Cost Calculator—a ready reference slide rule showing comparative steam costs when using oil, gas, or coal as fuel. Mailed on request — no obligation.

Cleaver-Brooks
STEAM BOILERS

FOOD MANUFACTURERS:

Dollars Are Important to You

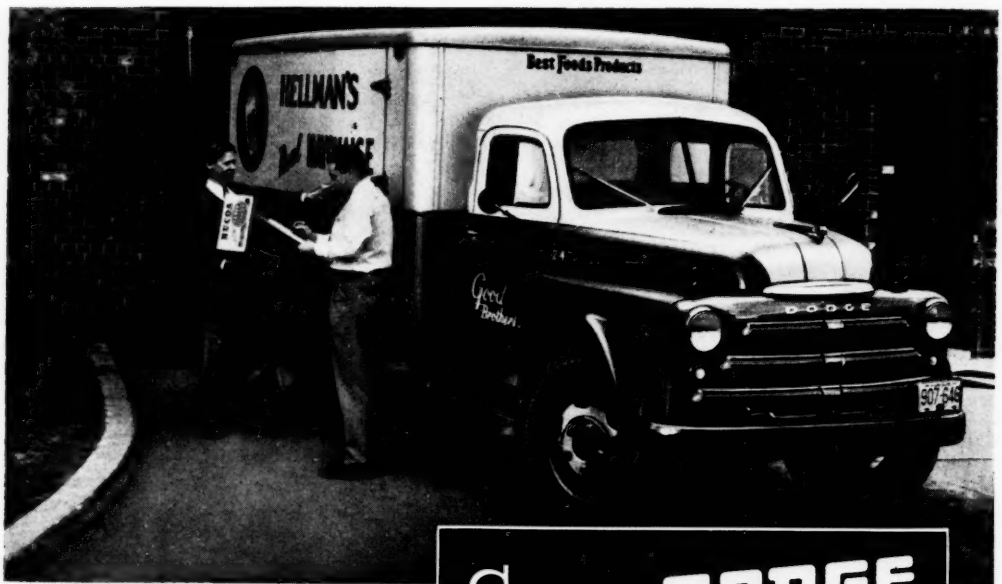
Dollars saved are dollars earned. So why shouldn't you save every dollar you can . . . on *delivery* costs? Dodge "*Job-Rated*" trucks are built to do just *that.*

They're priced with the lowest. They're built *to fit* your particular hauling needs. They stay *out* of the repair shop and *on* the job . . . saving money every mile you drive them.

For example, your Dodge truck will have the right one of 7 "*Job-Rated*" truck engines. You will pay only for the power you need . . . on *your* job.

Your Dodge will have the right clutch, transmission, rear axle, and every other unit . . . "*Job-Rated*" for maximum dependability; minimum upkeep expense.

So, if dollars still count in *your* business, see your Dodge dealer. Ask him to recommend the right "*Job-Rated*" truck for your business. Remember . . . *only* Dodge builds "*Job-Rated*" trucks.



For the good of your business—

Switch to DODGE "Job-Rated" TRUCKS

Books

Food Analysis

TRACE ELEMENTS IN FOOD. *By G. W. Monier-Williams. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1949. 511 pages; 5¾x8½ in.; cloth. Price, $6.*

Food chemists frequently run into difficulty when required to evaluate trace elements in foods. There is often no authority to which they can turn and equally often no relative values that they can apply.

For the 28 elements—including iron—designated in this book as "trace elements", the author has attempted a comprehensive survey on all aspects of the questions involved.

The book covers the effect of different quantities of each element on animals and men, and explains methods by which the amount of each in food may be determined. It also discusses the biochemistry, nutritional significance and toxicology of the trace elements. Particularly important to the food manufacturer is the author's examination of the many ways a trace element may gain access to food during processing and distribution.

World Milk Utilization

BETTER UTILIZATION OF MILK. *FAO Agricultural Studies No. 7. By D. A. Soulides. Food & Agriculture Organization of the United Nations, 1201 Connecticut Avenue, N. W., Washington 6, D. C. 76 pages; 6x9 in.; paper. Price, 75c.*

This study surveys current practices of milk use in countries not advanced in dairying and outlines ways of improvement. It also deals with the possibility of increasing human consumption of dairy byproducts where the dairy industry is advanced but milk shortages have developed.

Tall Corn Story

CORN AND CORN GROWING, *5th edition. By Henry A. Wallace and Earl N. Bressman. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1949. 424 pages; 5½x8¼ in.; cloth. Price, $4.50.*

Corn, in one form or another, is a raw material that few in the food industry can ignore. This revised edition tells the story from seeds to grain.

Added in this edition are historical factors previously published only in scientific reports, more material on fertilizers, data on recently developed chemical methods of controlling weeds and insect pests, increased uses of corn grain and parts of the corn plant as raw materials, and fuller detail on the uses and importance of hybrid corn.

Two new contributors had a hand in the preparation of this edition. J. J. Newlin, vice-president, Pioneer Hy-Bred Corn Co., was one of the first growers to explore the possibilities of hybrid corn. Edgar Anderson, geneticist to the Missouri Botanical Garden, is a highly respected authority on corn. Earl N. Bressman, one of the original authors, holds a distinguished teaching record in the middle and far west and has also served as scientific advisor to USDA. And not even his sharpest critics have ever accused Henry A. Wallace of being muddled on the subject of corn.

Warehousing

STORAGE OF CANNED FOODS. *By R. V. Murray. Published by Continental Can Co., 100 E. 42nd St., New York 17, N. Y., 1949. 31 pages; 5½x7½ in.; paper. Free.*

Most of the numerous aspects of canned food storage are covered in very little space in this study. Particular stress is laid on packer warehousing, with discussions of the pros and cons of such matters as one- and two-story buildings, methods of materials handling, temperature and humidity, and other factors affecting quality, nutritive value, container corrosion, and the like.

Government Publications

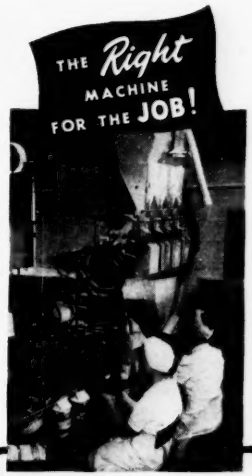
SCHOOL LUNCH RECIPES USING FISH. *Bureau of Human Nutrition Leaflet P.1-66.* Gives recipes for institutional service.

CONTROLLING THE JAPANESE BEETLE. *Department of Agriculture, Farmers' Bulletin 2004. Price, 15c.* Summarizes available information on the distribution, seasonal history, and natural factors that influence the incidence of the Japanese beetle.

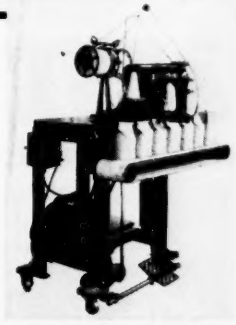
SOIL MOISTURE AND WHEAT YIELDS ON THE HIGH PLAINS. *By H. H. Finnell. Department of Agriculture, Leaflet 247.*

FACTORS AFFECTING THE NUTRITIVE VALUE OF FOODS. *Department of Agriculture. Miscellaneous Publication 664. Price, 10c.* Describes studies at U. S. Plant, Soil & Nutrition Laboratory.

(Books Continued)



No two jobs are exactly alike—that's why Union Special builds a wide variety of bag closing equipment. It's also the reason why Union Special field representatives make a careful study of requirements before giving you detailed recommendations on the kind of equipment to install. *If it's "Union Special," it's right for the job!* **UNION SPECIAL MACHINE COMPANY, 450 North Franklin Street, Chicago 10, Illinois.**



Style 21800 N bag closing machine equipped with Style 60000 D sewing head for making Union Special's exclusive Dubl-Tape closure on small paper bags.

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There are many possible layouts for moving cases, cartons, and units of merchandise from one operation ... and from one department ... to another. But for one individual plant there is one best, most efficient, economical way. As no two fingerprints are alike ... so is your plant different from the others! Alvey Conveyor Mfg. Co.'s experience in the food industry ... with well-known installations from coast to coast ... speaks for Alvey flex-ABILITY ... for Alvey's fingerprint approach to every conveying problem.

*Trademark

Includes discussion of vitamin and mineral content for both human foods and animal feeds.

CHEESE. *Bureau of Dairy Industry. BDIM-Inf-36, revised April,* 1949. *Mimeographed.* Lists publications of the Bureau of Dairy Industry relating to cheese.

FAO OILSEED MISSION FOR VENEZUELA. *Food & Agriculture Organization of the United Nations,* 1201 *Connecticut Ave., N. W., Washington* 6, *D. C. Price,* $1.00. A general report, similar in nature to field studies by FAO in areas elsewhere in the world.

ALCOHOL DATA. *Annual Report of the Commissioner of Internal Revenue. For the fiscal year ended June* 30, 1948. *Price,* 45*c*. Includes the very detailed data on alcoholic beverages and industrial alcohol customary in this administrative and technical record.

TRENDS IN MAN-HOURS EXPENDED PER UNIT IN SOAP AND GLYCERIN MANUFACTURE 1939 TO 1947. *Unnumbered document. Bureau of Labor Statistics. Mimeographed.*

ECA AND STRATEGIC MATERIALS. *Senate Report* 140, 81*st Congress.* Outlines influence of the relief and rehabilitation program of ECA in securing essential, critical, and strategic materials.

LIST OF AVAILABLE PUBLICATIONS OF THE DEPARTMENT OF AGRICULTURE. *Compiled by Eleanor W. Clay. Miscellaneous Publication* 60, *revised November,* 1948. Gives complete list of all series of documents that were available November, 1948.

THE NEW INSECTICIDES FOR CONTROLLING EXTERNAL PARASITES OF LIVESTOCK. *Department of Agriculture, E-762 (revised).* Emphasizes essential safety restrictions in indicating proper field methods to secure maximum effectiveness.

PORTABLE WATER-JET PUMPS. *By M. L. Fein. Bureau of Agricultural & Industrial Chemistry. AIC-223. Available from Eastern Regional Research Laboratory, Philadelphia* 18. *Mimeographed.* Small scale engineering laboratory equipment.

The above recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, *D. C. When no price is indicated, the pamphlet is free and should be ordered from the bureau responsible for its issue.* —End

We're always running into new uses for Stainless Steel

Allegheny Metal is one material that gets around—*plenty!* In fact, stainless steel has something important to do with practically all the food and dairy products you eat—the clothes you wear—the drugs and chemicals you use—the gasoline and oil you buy—the paper you read—the cars, buses, planes and trains you ride in . . . yes, even the electric power that leaps to serve you at the flip of a switch.

And that's only mentioning a few of stainless steel's major fields of use. The gist of the matter is that *no other metal* combines the qualities of great strength, shining beauty and resistance to corrosion, heat and wear to the same degree that stainless steel does.

Somewhere, *you* can use Allegheny Metal to advantage. In many cases it costs little or no more than lesser metals at the start, and in practically all cases it's far cheaper in the long run. ● Let us help you find the way and make it pay.

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WORTHINGTON

REFRIGERATION REPORT

WORTHINGTON PUMP AND MACHINERY CORPORATION
HARRISON, NEW JERSEY

Specialists in air conditioning and refrigeration for more than 50 years

Motorship "Saipan", operated by Columbia River Packers Association as "freezer ship" for tuna fleet.

What To Take On A Fishing Trip

"Saipan" and "Tinian" are the memory-provoking names of two refrigeration vessels which are helping to revolutionize the tuna industry.

The idea is to relieve the fishing vessels of duty as carriers and permit them to concentrate on fishing. The "floating ice boxes" accompany the fleet and freeze the catch on the spot.

These carriers, operated by Columbia River Packers Association, are the largest engaged in this work.

Freezing is accomplished in a 75-ton capacity brine tank in which covered galvanized steel baskets, each containing 1250 lb of fish, are stacked. Brine is pumped through banks of ammonia coil. The coiling is especially heavy in order to provide effective cooling in tropical temperatures. 75 tons of tuna are frozen in 24 hours.

The refrigeration is provided by four 8" x 8" vertical Worthington Compressors, working through a single-stage compression system.

View of freezing tank, showing exceptionally heavy coiling.

We Keep It 40 Below By The Stillaguamish

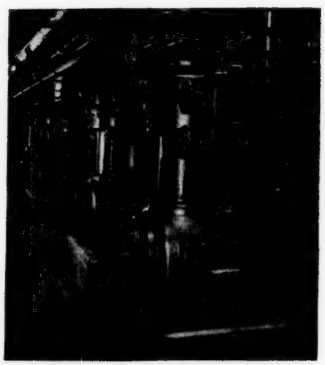
On the rich lowlands formed by the Stillaguamish River which runs by East Stanwood, Wash., is an immense acreage planted in strawberries, raspberries, peas and corn.

Here, in "the heart of the harvest", Pictsweet Foods Inc. built its quick-freezing plant, so as to preserve "peak of crop" freshness.

To service two large freezing tunnels, Pictsweet built a 1200 hp refrigeration compressor room, housing fifteen compressors. The temperature in these tunnels must be kept very low, so the compressors must maintain temperatures as low as -40 F.

It requires two stages to pump heat from this low temperature, and five Worthington 6HA6 Ammonia Booster Compressors are installed for the first step. These Worthington units pump the low pressure gas directly from the evaporator coils in the tunnels and compress it for the last stage units including Worthington 10 x 10 Vertical Ammonia Compressors.

Five Worthington Ammonia Booster Compressors used for quick-freezing.



Worthington Vertical Compressors at Quincy Market Cold Storage & Warehouse Co., Watertown, Mass.

30 Miles of Brine

The largest frozen food storage plant in New England—the plant operated by Quincy Market Cold Storage & Warehouse Co. — depends upon Worthington refrigeration equipment to maintain room temperature at minus 10F and a constantly high humidity.

Refrigeration for brine which travels through 165,000 ft of 2 in. pipe (roughly 30 miles), is supplied through four Worthington 10 x 10 vertical single-acting ammonia compressors, each driven by a 140 hp Diesel engine and operating from 200 to 400 rpm. They are equipped with 16 in. x 14 in. horizontal condensers.

All four compressors can be used at once for brine cooling or two can be diverted to quick-freeze rooms which are piped for direct expansion.

These compressors include such important features as Worthington Feather* Valves (simplest, most durable ever made) for both suction and discharge, unit-type manifold with quick-opening relief valve, water-jacketed cylinders, forged steel crankshafts and connecting rods.

Other Worthington equipment includes one 38 in. x 16 in. receiver and two 34 in. x 18 in. brine coolers.

Engineers: Ganteaume & McMullen, Boston.
*U. S. Reg. Pat.

A9-9

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

A complete line . . . in which *all* the vital components are *made*, not just assembled by Worthington. For *more worth with Worthington*, see your nearby Worthington distributor (consult Classified Telephone Directory).

Patents

Natural Seasoning of Canned Fish Accelerated by Addition of Small Quantity of Reducing Agent to Fish Prior to Canning—*Erling Mathiesen, Stavanger, Norway, to Hermetikkindustriens Laboratorium, Stavanger, Norway. No. 2,461,651. Feb. 15, 1949.*

Fatty Materials Deodorized During Continuous Distillatory Treatment—*K. McCubbin and C. E. Monical to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,461,694. Feb. 15, 1949.*

Shell Eggs in Rows Inspected During Passage Along Table Across Light Source—*J. R. Clark, Denver, 50 percent to C. D. and E. A. Hingley. No. 2,461,721. Feb. 15, 1949.*

Phosphatides Recovered From Oleaginous Material by Extraction With Hexane, Trichloroethylene, Benzene or Ethanol—*R. A. Marmor and W. W. Moyer to A. E. Staley Mfg. Co., Decatur, Ill. Nos. 2,461,750 and 2,461,751. Feb. 15, 1949.*

Antioxidants for Stabilization of Fats Obtained by Extracting Crude Fatty Material to Recover Natural Antioxidant Content—*L. O. Buston, Maplewood, and C. E. Dryden, East Orange, N. J., to Nopco Chemical Co., Harrison, N. J. Nos. 2,461,807 and 2,461,808. Feb. 15, 1949.*

Dry Undenatured Gluten, Glycerine, Hydrochloric Acid and Ortho-Cresol Mixed and Heated to 50 Deg. C. to Make Gluten Plastics—*L. Lowen, Wyandotte, Mich., to Chemprotin Products, Trenton, Mich., L. Kormendi, New York City, and B. C. Boeckeler, Grosse Ile, Mich. No. 2,461,829. Feb. 15, 1949.*

Shell Eggs Mechanically Cleaned by Action of Motor-Driven Rotor with Abrasive Surface on Under Side of Radiating Arms—*A. U. Bryant, Alameda, Calif. No. 2,461,960. Feb. 15, 1949.*

Wedge-Shaped Individual-Service Cheese Wrapped in Flat Sheet of Wrapping Material by Mechanical Means—*J. E. Hills to Kraft Foods Co., Chicago. No. 2,461,981. Feb. 15, 1949.*

Baked Loaves Automatically Removed From Open-Topped Pans—*H. J. Harker, Detroit, to Purity Bakeries Service Corp. No. 2,462,921. Feb. 15, 1949.*

Potatoes Sliced by Rotating Disk Operating Through Horizontal Plane—*S. M. Kobey to Potato Chip Equipment Corp. Denver. No. 2,462,105. Feb. 22, 1949.*

Purified Amino Acids Obtained From Aqueous Hydrolysate by Precipitation as Metal Salt, Filtration and Conversion to Acid Form—*C. Neuberg and H. Lustig, to Interchemical Corp., New York City. No. 2,462,124. Feb. 22, 1949.*

Starch Converted Into Formate by Treatment With Formic Acid Preliminary to Esterification by Means of Organic Acylating Agent Containing at Least Three Carbon Atoms—*O. A. Moe, Minneapolis, to General Mills, Inc. No. 2,462,210. Feb. 22, 1949.*

Irish Moss Subjected to Super Saturated Steam at 5 to 50 psi. Above Atmospheric Pressure For Extraction of Carbohydrate Constituents—*M. P. Hess, Maywood, and A. E. Siehrs, Chicago, to Krim-Ko Corp., Chicago, No. 2,462,398. Feb. 22, 1949.*

Essential Polyamino Acids Separated From Mixtures Containing Monoamino Acids—*R. J. Block, Scarsdale, N. Y., to C. M. Armstrong, Inc. No. 2,462,597. Feb. 22, 1949.*

Animal Fatty Material Stabilized Against Rancidity by Incorporation of 0.1 Percent of Compound Containing Enediol Group, Para-Amino-Benzoic Acid and Caffeic Acid—*F. A. Norris, Minneapolis, to General Mills, Inc. No. 2,462,663. Feb. 22, 1949.*

Animal Fatty Material Stabilized by Addition of 0.1 Percent of Compound Containing Enediol Group and Gallic Acid or Its Lower Aliphatic Esters—*F. A. Norris, Minneapolis, to General Mills, Inc. No. 2,462,664. Feb. 22, 1949.*

Kaiser Rolls Held and Turned by Specially Designed Bakers Peel—*L. Portner, Margate City, N. J. No. 2,462,672. Feb. 22, 1949.*

Cherries Mechanically Stemmed and Sorted During Passage on Endless Conveyor Through Frame Constructed of Slats to Engage and Remove Stems—*H. M. Schubert, Salem, Ore. No. 2,462,682. Feb. 22, 1949.*

Tin-Coated Baking Pans Externally Painted With Heat Absorbing Non-Permanent Coating Which Gradually Exposes Tin Surface for Burning Out of Pans to Improve Their Crust-Producing Performance—*J. H. Debs, to Chicago Metallic Mfg. Co., Chicago. No. 2,462,728. Feb. 22, 1949.*

Fresh-Frozen Meats Protected With Coating

(Patents Continued)

MONOSODIUM GLUTAMATE

Hydrolyzed VEGETABLE Protein

These derivatives of wheat protein are being used by many food manufacturers to

IMPROVE FLAVORS IN FOODS

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WEARING AN ASPHALT RAINCOAT!

● **Probably you'd look terrible. But one thing is sure—you'd stay *dry!* For asphalt keeps out moisture. And that's why we use asphalt to help keep Diamond Crystal Salt dry, and prevent caking.**

Salt usually cakes in excessive humidity, because moisture condenses on salt particles, forming a thin layer of brine. Then, in dry weather, the brine evaporates and the crystals knit together.

Our research laboratory has found a number of ways to help prevent salt caking. Removal of moisture-attracting impurities, such as calcium chloride, helps. So does complete removal of fines by careful screening. Most important is to provide salt with a moisture- and vapor-resistant package.

Take our Flour Salt bag, for example. It is composed of three 50-lb. and two 25-lb. sheets of kraft, laminated together with 40 lbs. of asphalt per ream. That's a lot of asphalt, and it costs us more money—but our moisture-vapor transmission tests show this bag is worth the extra cost. The bag is even sewn with *waxed thread* to seal the holes made by the sewing-machine needle. That's real *protection*—one reason we have been able to eliminate caking as a major problem!

Want Free Information On Salt? Write Us!

If *you* have a salt problem, write our Director of Technical Service. He will be happy to help! Diamond Crystal Salt, Dept. J-18, St. Clair, Mich.

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CLEAN...
and COLORFULLY SEALED
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Ware Heat Seal has been developed for the clean, fast application of labels to a variety of surfaces including film-wrapped food products. This odorless paper lends itself to colorful printing, giving you both economical and effective identification. Once applied to these surfaces, a Ware Heat Seal is permanent. Inquiries for descriptive literature are invited.
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Consisting of Gelatin and Flour of Composition to Prevent Formation of Tacky Mass of Carbonized Gelatin During Cooking of Meat—*H. S. Mitchell, Chicago, L. E. Kay, Worth and A. S. Hartanov and J. M. Ramsbottom, Chicago, to Swift & Co., Chicago.* No. 2,462,760. Feb. 22, 1949.

Irish Moss Residue, After Extraction With Hot Water at Atmospheric Pressure, Subjected to SO_2 for 30 to 60 Min. Preliminary to Extraction of Gelose Content With Fresh Hot Water, Drying of Gelose and Powdering—*M. P. Hess, Maywood, and A. E. Siehers, Chicago, to Krim-Ko Corp., Chicago.* No. 2,462,863. Mar. 1, 1949.

Glyceride Oils Freed of Gums and Other Trace Impurities by Treating with Aqueous Caustic Alkali and Centrifuging—*B. H. Thurman, New York City, to Benjamin Clayton, Houston, Tex.* No. 2,462,923. Mar. 1, 1949.

Sausage Filled Casings Tied by Mechanical Means—*J. C. Gunn, Sacramento, Calif.* No. 2,462,957. Mar. 1, 1949.

Animal and Vegetable Oils Freed of Metallic Impurities by Treatment With Alkali Metal Salt of Ethylene Diamine Tetra-Acetic Acid—*F. C. Bersworth, Verona, N. J.* No. 2,463,015. Mar. 1, 1949.

Fish Mechanically Positioned and Conveyed Tail Leading With Back Down—*C. M. Savrda, Bay Shore, N. Y., and W. H. Hunt, National City, Calif., to Fish Machinery Corp., Boston.* No. 2,463,060. Mar. 1, 1949.

Fruit Juices Extracted in Machine Equipped With Rotary Carrier for Cut Pieces of Fruit, Rotary Extractor Having Plurality of Plungers on Periphery and Means for Collecting Juice and Removing Rinds from Plungers—*H. L. Smith and N. B. Wood, Clearwater, Fla., to Food Machinery & Chemical Corp., San Jose, Calif.* No. 2,463,125. Mar. 1, 1949.

Casing Membrane Removed From Wieners, Frankfurters and Similar Products by Mechanical Means—*R. H. Deitrickson, one-half to J. M. Little, Toledo, Ohio.* No. 2,463,157. Mar. 1, 1949.

Grapefruit Segmented and Rind Removed by Manually Operated Device—*F. C. Ghisletta, Patterson, Calif.* No. 2,463,167. Mar. 1, 1949.

Fresh Milk Treated With Carbon Monoxide and Acetylene to Inhibit Oxidation—*M. E. Dunkley, Modesto, Calif.* No. 2,463,363. Mar. 1, 1949.

Prolamine Used as Emulsifying and Stabilizing Agent in Emulsion of Oleaginous Material in Glycerol—*F. W. Bernhart, Holt, Mich., to Wyeth Inc., Philadelphia.* No. 2,463,738. Mar. 8, 1949.

Pigment of Shelled Peanut Skins Removed by Treating Unskinned Peanuts With Dilute Alkaline Solution for Short Period of Time—*R. S. Burnett, New Orleans, to U. S. A.* No. 2,463,740. Mar. 8, 1949.

Glutamic Acid Treated With Aliphatic Acyl Halide and Alkaline Earth Base to Make N-Acylated Derivatives—*E. B. Kester, Berkeley, Calif., to U. S. A.* No. 2,463,779. Mar. 8, 1949.

Baking Pans Greased With Hard Fat of 200-Mesh Fineness Mixed With Calcium or Magnesium Stearate—*F. F. Hansen, Pittsburgh.* No. 2,463,870. Mar. 8, 1949.

Gluten Hydrolyzed With HCl and pH Ad-

(Patents Continued)

You can tell Norda Raspberry Flavor because it's the *rich* raspberry. Fat, fresh berries the sun has ripened couldn't taste more delicious.

Norda Red and Black Raspberry—genuine or fine imitation—are real raspberry with superb true-fruit flavor. Make your syrups, mixes, candies, gelatins more popular by improving them now with these great Norda favorites.

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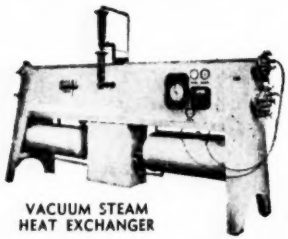
Chisholm-Ryder

Quality Food Processing

CRCO Heat Exchangers and Fillers Reduce Costs on the Tomato Line

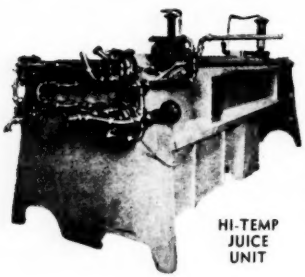
Substantial labor savings are insured by the use of CRCO equipment, designed to increase the capacity of the lines and improve the quality of the product. This today is most important to processors as it means lowered costs and better prices for quality products.



VACUUM STEAM HEAT EXCHANGER

Pre-Heat and Cook

The CRCO Vacuum Steam Heat Exchanger for pre-heating and cooking juices has automatic steam and temperature controls which will maintain any predetermined temperature throughout the day's run. Entirely sanitary and easy to clean. Available in single, double or combination tube models.



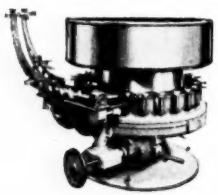
HI-TEMP JUICE UNIT

Pre-Heat, Cook and Cool

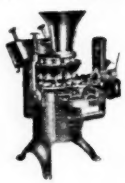
The CRCO High Temperature Unit pre-heats, cooks, holds and cools to filling temperature in one automatic operation. Economical in use of steam as it is recovered from the cooking operation and reused to preheat the product. Equipped with automatic steam and temperature controls.

A CRCO Filler for Every Purpose

CRCO-Ayars Fillers are available for tomato products in three types: The Hi-Speed Liquid Filler for juices, the Universal for cut and whole tomatoes and the "600" for premium packs of whole tomatoes. Write today for complete specifications.



JUICE FILLER



TOMATO FILLER

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THE BEST OF Everything

CHISHOLM-RYDER CO. INC.

Niagara Falls, New York

FOR THE FOOD PROCESSOR

Patents

justed With NaOH in Two-Step Process to Obtain Crude Glutamic Acid With Recirculation of Mother Liquor—*F. A. Hoglan, Toledo, Ohio, to International Minerals & Chemicals Corp.* No. 2,463,877. Mar. 8, 1949.

Cream Subjected to Inert Gas Under Pressure to Expand Its Volume Preliminary to Agitation for Coalescence of Fat Granules Into Butter With Liberation of Gas—*G. W. Shadwick, Chicago, to Beatrice Creamery Co.* No. 2,463,915. Mar. 8, 1949.

Beverage Liquid Carbonated by the Effervescence of Carbamino Salt Mixture—*H. J. Gorcica, Prospect Heights, Ill., and L. J. Novak, Decatur, Ind., to Fearn Laboratories Inc., Franklin Park, Ill.* Nos. 2,463,962 and 2,463,963. Mar. 8, 1949.

Protein and Hemicellulose Simultaneously Recovered From Oil Seed Residue Meal—*G. Davidson, Aurora, Ill.* No. 2,464,075. Mar. 8, 1949.

Starch Content of Starchy Materials Modified by Adjustment in Moisture Content Between 10 to 40 Percent and by Subjecting to Action and Pressure of Cooled Differential Rolls at Temperature Below the Starch-Pasting Temperature—*D. W. Hansen, L. O. Gill and J. H. Wrightsman, to A. E. Staley Mfg. Co., Decatur, Illinois.* No. 2,464,081. March 8, 1949.

Vegetable and Fruit Eyes Removed by Manually Operated Mechanical Means—*J. T. White, Palmyra, Mo., 20 percent to J. G. White, Ogden, Utah, 20 percent to E. A. White, Downers Grove, Ill., 20 percent to H. D. White, Chicago, and 20 percent to R. L. White, Palmyra, Mo.* No. 2,464,164. Mar. 8, 1949.

Sugar Cane Wax Residue, After Soft-Fraction Extraction, Freed of Resinous Fraction by Treatment With Liquid Fat Solvent—*O. J. Swenson, Ithaca, N. Y., to Colonial Sugars Co., New York City, and S. C. Johnson & Son, Inc., Racine, Wis.* No. 2,464,189. Mar. 8, 1949.

Sodium Chloride Crystals Wetted With Film-Forming Solution Containing Papain and Buffering Agent and Dried at Not Over 140 Deg. F. to Form Stable Dry Papain Products—*L. A. Hall, to The Griffith Laboratories, Inc., Chicago.* No. 2,464,200. Mar. 15, 1949.

Moisture-Conditioned Wheat, Rye, Corn, Beans, Soybeans and Peas Milled by High Velocity Centrifugal Impaction to Shatter and Break Germ Away From Endosperm and Hull, Sifted, and Again Impacted to Loosen Whole Portions and Disintegrate Endosperm Followed by Sifting and Further Disintegration by Centrifugal Impaction—*R. J. S. Carter and H. McDonald, Minneapolis, to Pillsbury Mills, Inc.* No. 2,464,212. Mar. 15, 1949.

Riboflavin Obtained by Oxidizing Leuco-Riboflavin Recovered From Aqueous Solution by Extraction With Primary and Secondary Unsubstituted Alcohol Slightly Soluble in Water—*D. A. Legg, Philadelphia, and J. T. Cramner, Oaklyn, N. J., to Publicker Industries, Inc.* No. 2,464,243. Mar. 15, 1949.

Antioxidant for Fatty Material Made to Consist of Vegetable Carrier Oil and Synergistic Mixture of Tocopherol, Low Molecular Weight Alkyl Ester of Gallic Acid and Lecithin—*L. A. Hall and L. L. Gershbein, to Griffith Laboratories, Inc., Chicago.* No. 2,464,927. Mar. 22, 1949.

—End

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Fig. 629

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Quality Penny Items

—Continued from page 50

tions of the various departments by an exchange of information on problems of each unit. Department heads thrash out the nature of the problems and how they may affect their own departments. Efficiency is augmented by a thorough understanding of each unit's functions.

Management has also found that many workable ideas for improvements result from this exchange of information, because of the broader point of view gained by all participants. The ideas flow both ways—not only do they come down from the top, but they also come up from the bottom.

The special value of these meetings can be demonstrated by this example:

During the war, the twisting-paper used to kiss-wrap bubble gum was short in supply. It had to be used on a day-to-day delivery basis, consequently, it was difficult for the manufacturing department to stabilize production, working with this "hand-to-mouth" supply. But, by discussing the problem with the purchasing and sales departments at a supervisory meeting, all departments understood the situation and there resulted a better scheduling of production and sales.

Improved Personnel Relations

Final step taken to increase efficiency—and improve morale at the same time—were the measures to improve personnel relations.

Most important, the company recognizes the value of job evaluation. Wage rates—termed high—are not made by snap judgment. Instead, each job is carefully evaluated by the wage and cost engineer.

In another step, a ½-acre vegetable garden was set aside behind the plant for employees interested in gardening. The company fertilizes the soil, turns the ground over in the spring, and supplies the tools. Employees work in the gardens during the lunch hour and after working hours.

Other steps were to provide indoor and outdoor recreational facilities. Activities are under the supervision of a recreation committee made up of employees—not the brass hats. Outdoor facilities include horseshoe pitching, badminton, and volley ball courts. There is also a softball diamond. Indoors, employees may enjoy table tennis, dart games, pinball machines, and juke boxes.

Because of the absence of satisfactory eating places near the plant, the company operates a cafeteria, where food is furnished to employees at less than cost. The cafeteria is large and

OIL BITTER ALMOND

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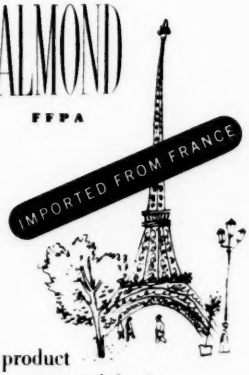

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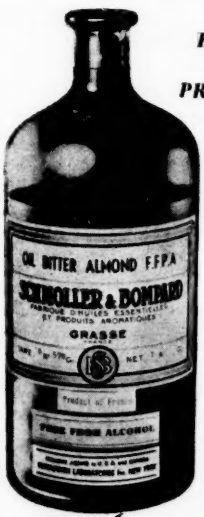

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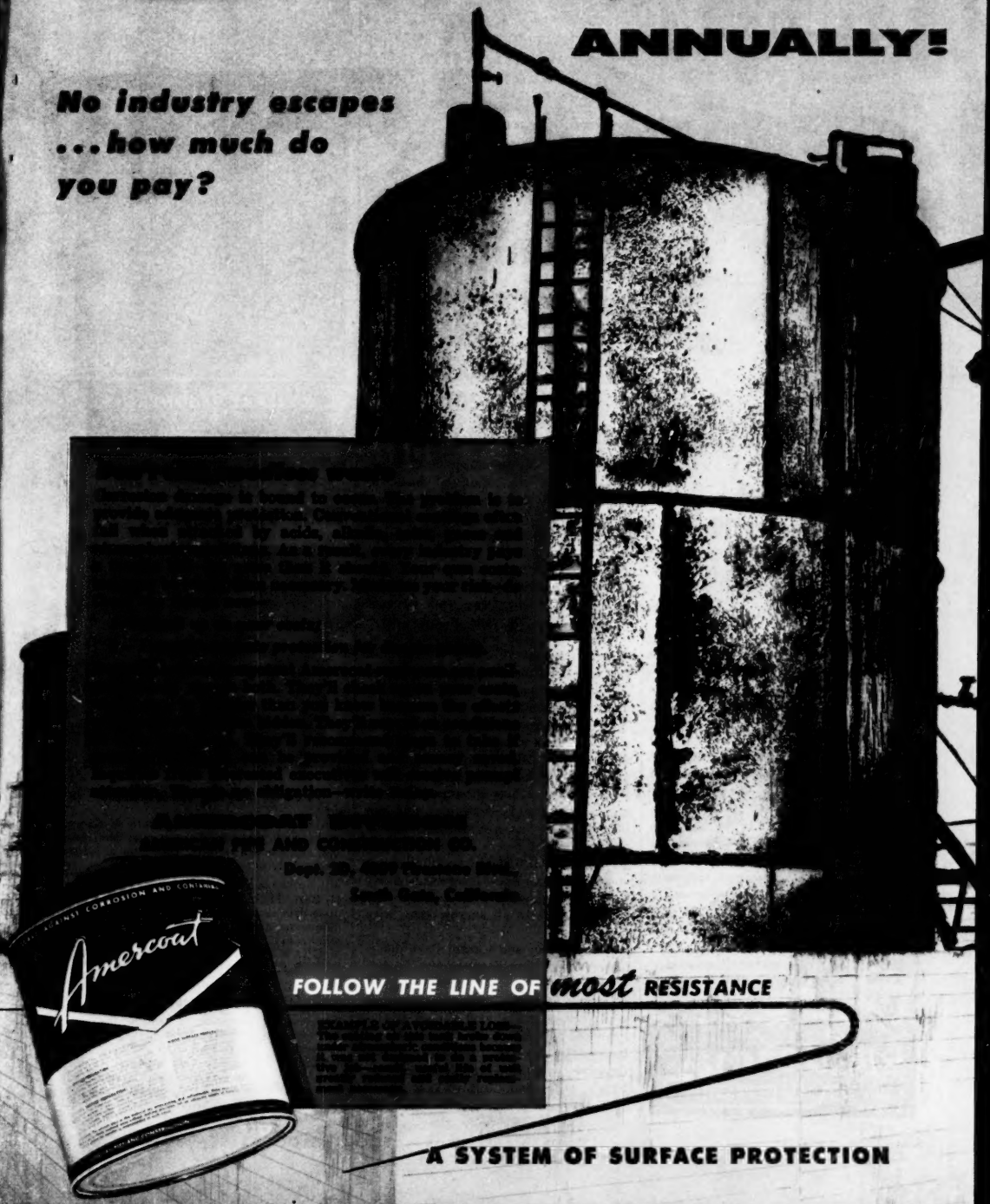

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well-lighted, and this area includes many of the recreational activities.

The company provides group health-and-accident insurance for its employees. It also operates a dispensary with full time nurses in attendance.

Fundamental policy of the personnel department is to hire the right workers for the right jobs. Employees are carefully trained in the technics of their jobs, and they learn what their jobs mean in the overall company structure. Management advises the workers regarding firm policies, and thus the employees acquire good company spirit, necessary for high morale.

—End—

Dextrose Curbs Browning

—Continued from page 41

of sugars with other materials were examined after storage and recorded by Pederson, Beattie and Stotz[2], and Kertesz and Sondheimer[3] have reported on the effect of cold storage temperatures on the retention of red color and the prevention of browning in strawberry preserves.

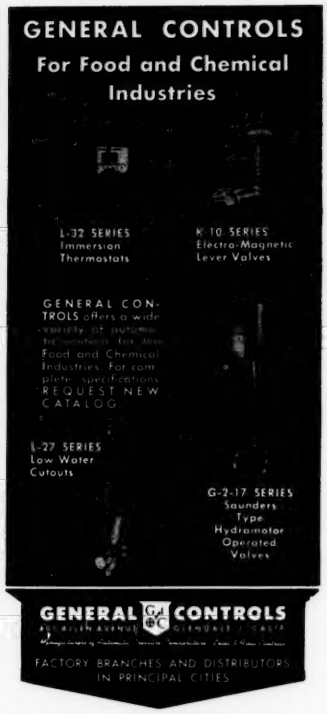
Discoloration Due to Sucrose, Levulose

Moreover, Montgomery and Wiggins[4] studied the effect of heat on aqueous solutions of sucrose and other carbohydrates, including dextrose, and indicated that sucrose produces hydroxymethyl-furfural at lower temperatures and to a greater extent than does dextrose.

Finally, Singh, Dean and Cantor[5] have discussed the role of 5-hydroxymethyl-furfural in the discoloration of sugar solutions. They also indicated that levulose produces discoloration to a greater extent than does dextrose under acid conditions.

Our findings are reasonably in line with the work reported by Eickelberg in his study of the reaction of dextrose and sucrose in more dilute solutions and for extended periods at temperatures as high as 250 deg. F. Effects of acid and heat, found by us, are also in line with the findings of Singh, Dean and Cantor[5]. It is well to point out that under any conditions where sucrose is likely to be inverted, severe discolorations are more likely with all sucrose than with dextrose.

Singh, Dean and Cantor have determined that color development is definitely related to the production of hydroxymethyl-furfural and levulinic acid. Montgomery and Wiggins[4] also have shown that sucrose produces far more hydroxymethyl-furfural than does dextrose, and at lower temperatures. Singh, Dean and Cantor[5] have shown that levulose produces far more hy-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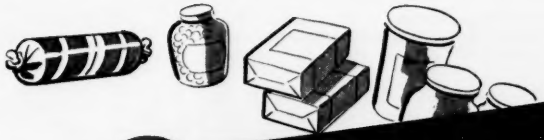
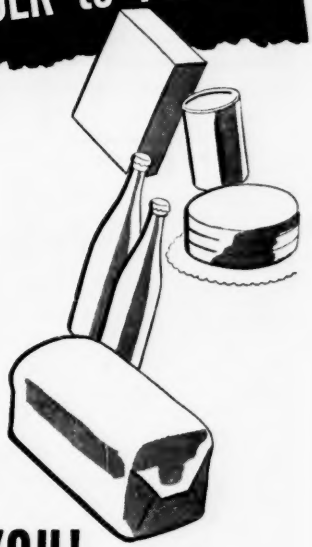


Finding Mrs. America HARDER to Please?



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COMPILED FROM SIXTY-ONE YEARS OF SPECIALIZED EXPERIENCE IN SEPARATIONS

Problem:

To recover clean mica from low grade ore.

Solution:

S S & S Process—Air-Flotation.

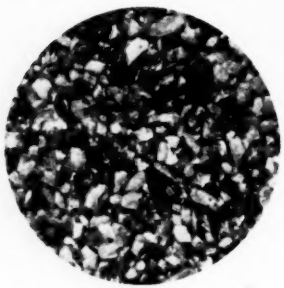
Here is photographic evidence* illustrating another successful application of *separation by specific gravity through air-flotation.*

The efficiency with which Sutton equipment was used here to recover clean mica from material composed of mica and gangue also emphasizes the engineering and economical feasibility of applying the S S & S Process for the *separation of virtually any type of dry granular particles from a component of varying bulk density.*

Check into your *own* plant operations with imagination. Sutton equipment is doing a big job for virtually every type of industry. It could be your answer, too.

*Unretouched photographs taken during pre-delivery tests.

"CRUDE AS RECEIVED" was composed of mica and gangue. Bulk of the material ranged from ¾" down to −8 +20 mesh.



PRODUCT NO. 1, consisting of gangue particles, was separated out at the "heavy" end of the Specific Gravity Separator deck.

PRODUCT NO. 4 consisted of large clean particles of mica, and was removed at the "lighter" end of the Separator deck.

LITERATURE AVAILABLE

Tell us about your separating problem. Let us check it against our testing laboratory records which cover hundreds of successful separations. In the meantime, we will forward literature giving a general description of the SS&S Process. Address information to:

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droxymethyl-furfural than does dextrose.

Pederson, Beattie and Stotz[3] indicate that brown color is developed to a greater extent with levulose than with dextrose in storage tests with synthetic mixtures comparable to naturally occurring fruit juices.

In the light of these observations, supported by our findings, it seems reasonable to conclude that the use of dextrose as a portion of total sugars can give better color to such foods as catsup, preserves, pickled beets and fresh cucumber pickles, all heat processed under acid conditions.

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1. E. W. Eickelberg, "How to Use Dextrose in Canning." FOOD INDUSTRIES, 33-5, Jan., 1940, 50-1, Feb., 1940.
2. C. S. Pederson, H. G. Beattie and E. H. Stotz, "Deterioration of Processed Fruit Juices." New York Agr. Exp. Sta. Bul. No. 728, 1947.
3. Z. I. Kertesz and E. Sondheimer, "Reducing Color Loss in Strawberry Preserves." FOOD INDUSTRIES 20, 1301-6, 1948.
4. R. Montgomery and L. F. Wiggins, "The Effect of Heat on Aqueous Solutions of Sucrose and Other Carbohydrates." *Journal Society Chemical Industry*, 66, 31-2, 1947.
5. B. Singh, G. R. Dean and S. M. Cantor, "The Role of 5-Hydroxymethyl-Furfural in the Discoloration of Sugar Solutions." *Journal American Chemical Society*, 70, 517, 1948.

—*End*—

Purity in Eclairs

—*Continued from page* 43

filling machine. This unit automatically fills eclair shells, six at a time, with a predetermined amount of custard. From the custard-filler, eclairs are conveyed to the chocolate enrober.

Precautions Taken

To prevent contamination of the eclairs after the filling operation, special precautionary measures and modified technics have been adopted.

One change was to completely coat the eclair with chocolate icing. Thus, the custard is entirely sealed in—a further measure against contamination from bacteria.

Another switch was in packing the eclairs for shipment. The pastries now emerge from the enrober onto a clean sheet of parchment paper which is automatically fed from a roll below a rubber-belt conveyor. At the end of the conveyor, the paper is cut into units each containing 24 coated eclairs. Here, an operator grasps the edge of the paper and slides it onto a clean sheet-pan. The pans are finally loaded into clean, completely enclosed, aluminum cabinets and taken to the shipping department. This procedure obviates contamination through handling.

Another precaution was to synchro-

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nize production with shipments to minimize the time lag between production and distribution.

Workers are periodically examined by the medical department. Before production begins, the foreman inspects his crew. Those with colds or open cuts on their hands and arms are replaced with trained alternates from another department.

Surgical Masks Worn

Other precautions: Before beginning work, employees must scrub their hands with soap and hot water. Next, their hands are rinsed twice—with water and with a germicidal solution containing a quaternary ammonium compound. The workers then put on rubber gloves and rinse them in the same solution. Finally, personnel operating the fillers and enrobers are required to wear surgical-gauze masks to prevent respiratory contamination.

Utensils such as spatulas and tongs are washed and then immersed in the germicidal solution.

At the end of operations, the Votator and filling machine are broken down, cleaned, and reassembled. And immediately before operations are resumed, steam at 15 lb. pressure is run through the equipment for 15 min.

Lab Keeps Tab on Eclairs

The laboratory carefully controls the ingredients used, cleanliness of equipment, and bacterial content of the finished product. Both the plant laboratory and a consulting laboratory make independent daily checks of the bacterial content of eclairs—former before shipment; latter in shops. Data of both laboratories are reviewed so that strict control can be constantly maintained on the quality of the eclairs up until the time that they are purchased.

Samples picked up from stores show that the total bacteria of the custard filling is far less than the maximum permitted by New York City's bottled milk law, which requires a count less than 30,000 per cc. In two years of operation, none of the eclairs sampled had *E. coli* despite the fact that frozen eggs commonly contain this organism, an index of fecal contamination.

As a final precaution, eclairs are sold only on the day they are made. Those not sold are discarded. Furthermore, in each box of eclairs customers find a slip informing them that the item is an egg and milk product and that it is perishable unless kept under refrigeration.

Acknowledgments: The authors wish to express their thanks for the assistance of A. E. Abrahamson and L. Buchbinder, of the New York City Department of Health.

—*End*

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FOR DIRECT CONTACT FREEZING, glycerine, glycerine-salt, and glycerine-invert sugar solutions have been found by one experimenter to be more satisfactory than any of the other salt, syrup, or combination solutions tested for direct contact freezing. (F-15)

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A VEHICLE FOR VANILLA contains corn syrup, glycerine U.S.P., and water. The solvent is said to be inexpensive, fluid, stable, and free from fermentation. (F-16)

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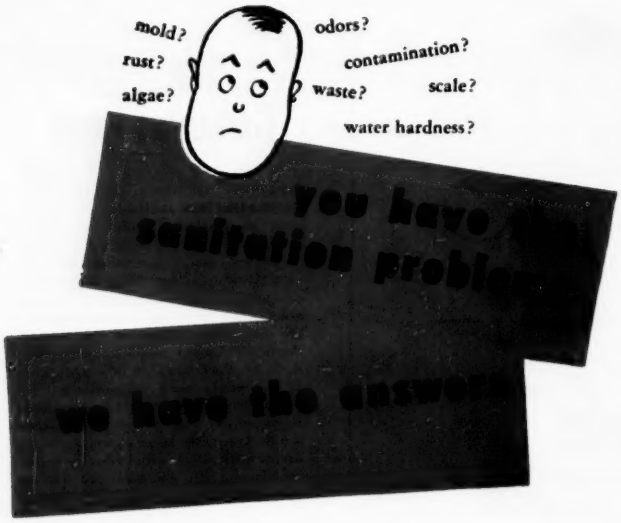

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Asparagus Color

—Continued from page 77

oleptic values for both of these samples, however, were similar. Therefore, when the samples were grouped on the basis of duration of storage, the correlations for each group were improved considerably, and were quite satisfactory (as shown in Table II).

The high correlation of 0.90 between the organoleptic values and the objective color determinations for the canned samples indicate that the difference between the color of the canned and raw samples is not merely a visual phenomenon. It is an actual differential loss in green pigment as a result of storage and processing. Thus, it appears that the greater the loss of green pigment in raw asparagus during storage, the lower will be the subsequent loss during processing.

This differential effect of storage of the raw product on color values of raw, as compared to canned, asparagus was further substantiated by analyzing the data by the variance method (results in Table III).

Chlorophyll content of the raw asparagus showed large, significant differences in both series during storage. There were no appreciable differences between organoleptic ratings for the canned product as a result of these same storage treatments of the raw product.

Whereas the effect of storage temperature is of possible significance in its effect on chlorophyll content of the raw stock, there is no significant effect of this factor on the organoleptic values of the canned product.

The effect of the portion of the stalk, on the other hand, is equally significant for both the chlorophyll content and the organoleptic ratings.

Data in Table IV shows the relation between organoleptic values and chlorophyll content of canned asparagus. The approximately logarithmic relationship also indicates that chlorophyll values beyond 75 ppm. are not easily recognized organoleptically, so that there is little advantage to attempt to establish color grades of canned asparagus in that range.

As indicated by the green pigment content, the relation of the color of the raw asparagus to the canned and frozen product before and after cooking, is presented (Table V). It is apparent that both the freezing and the cooking processes have a detrimental effect on color retention.

To Sum It Up

On the basis of data presented above, "green" asparagus may be defined as asparagus containing more

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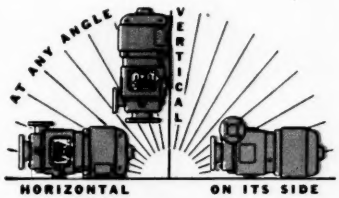

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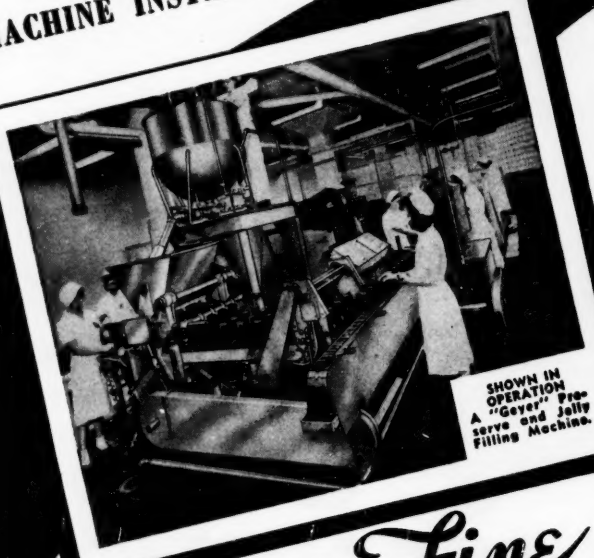

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than 10 ppm. of green pigment, calculated as chlorophyll. This value was equivalent to 91 percent transmittance when using the Beckman spectrophotometer, and 94 percent transmittance when using the Leitz photoelectric colorimeter.

These green pigment values were closely correlated with organoleptic evaluations for color. However, accuracy in predicting the color of the canned product was greatly reduced when using pigment values obtained on the raw product. This was because storage of the raw product prior to canning tended to decrease the pigment content of the stock.

Losses in color resulted from canning and freezing operations as well as from cooking of the frozen product.

The above article is from "A Rapid Objective Method for Measuring the Color of Raw, Canned, and Frozen Asparagus," Scientific Publication No. A240, Contribution No. 2171, of the Maryland Agricultural Experiment Station (Dept. of Horticulture). The research was partially supported from Regional Hope-Flanagan funds, Project NEM 3. This material is part of a paper presented before the American Society for Horticultural Science and the Tri-State Packers Association.

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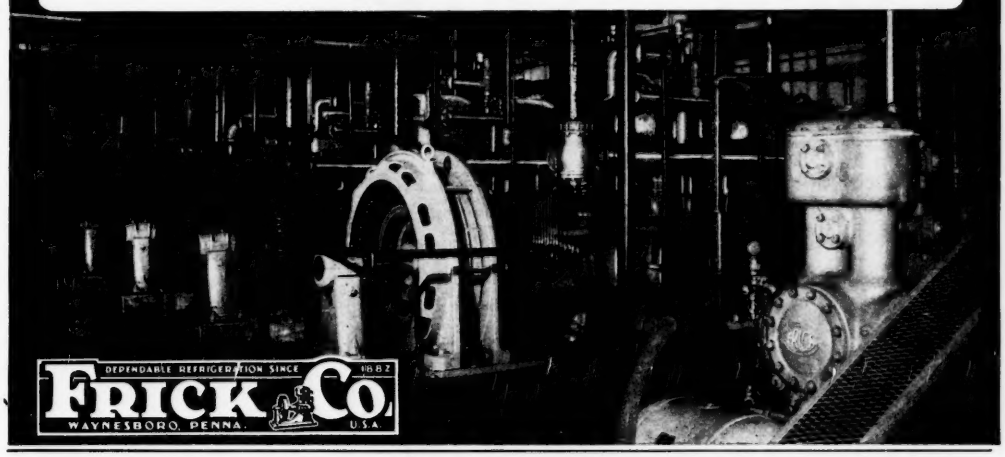

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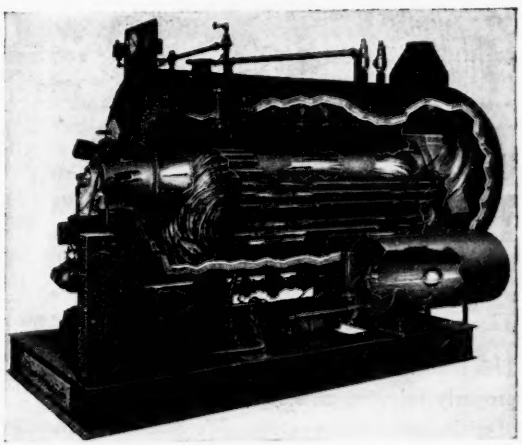

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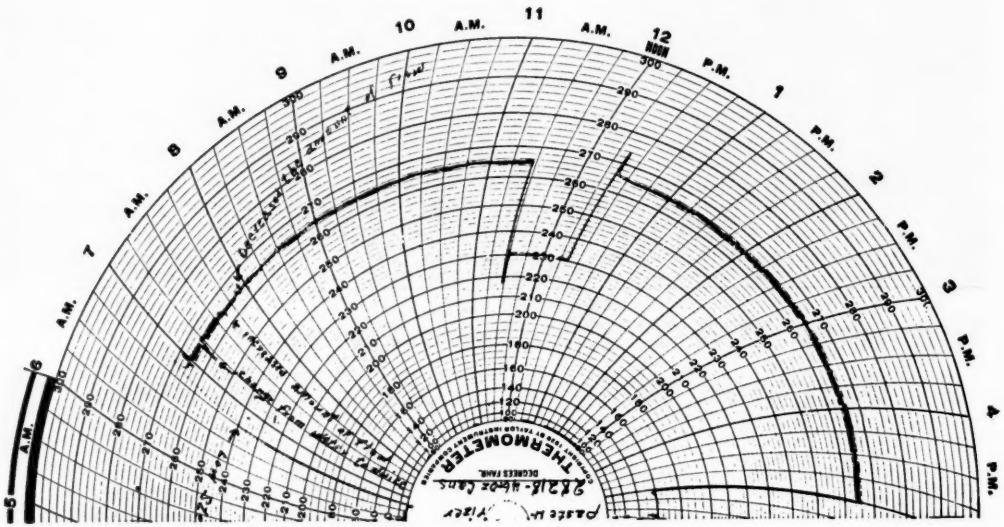

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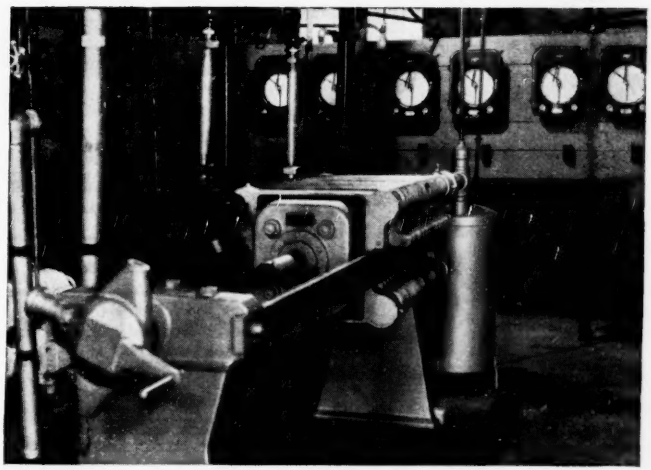

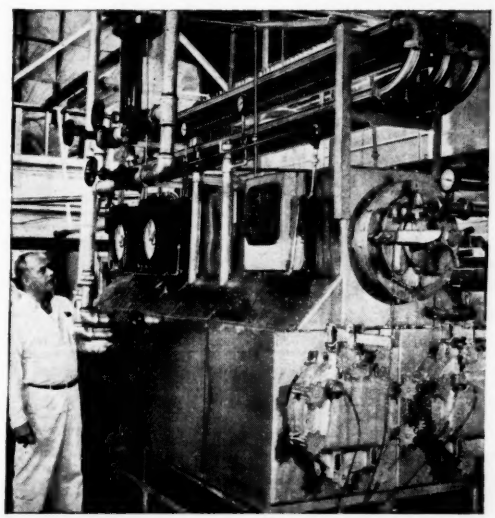

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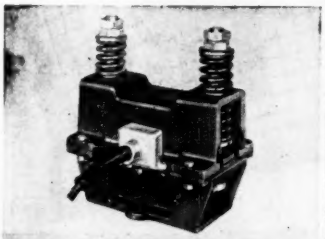

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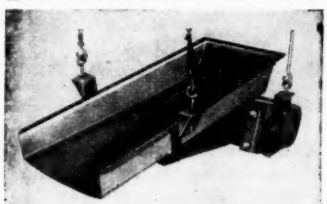

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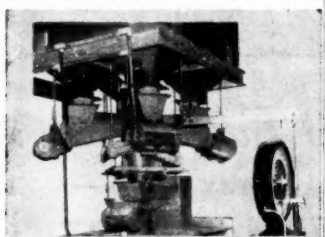

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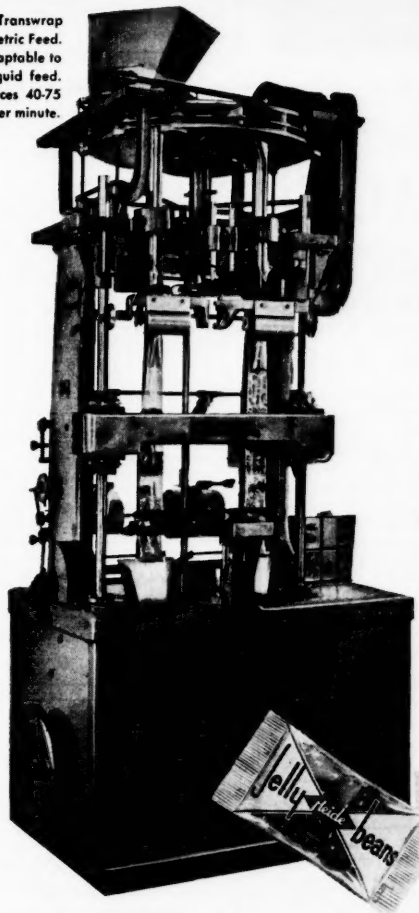

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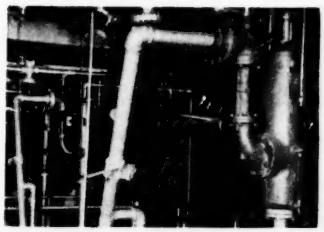

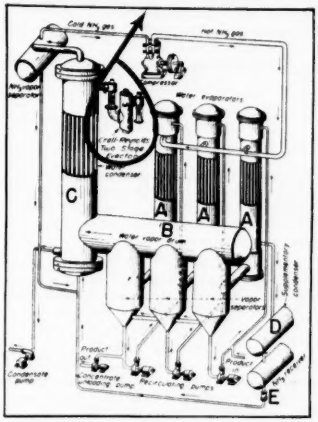

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Satisfy yourself — Satisfy your customers — Consult D & O.

D&O DODGE & OLCOTT, INC.

180 Varick Street • New York 14, N.Y.

ATLANTA • BOSTON • CHICAGO • CINCINNATI • DALLAS • LOS ANGELES • PHILADELPHIA • ST. LOUIS • SAN FRANCISCO

ESSENTIAL OILS • AROMATIC CHEMICALS • PERFUME BASES • VANILLA • FLAVOR BASES

It's *"Niagara"* for

NEW ECONOMIES IN PACKAGING

- CUTS LABOR COSTS
- CUTS OPERATING COSTS
- CUTS BAG COSTS
- LESS FLOOR SPACE
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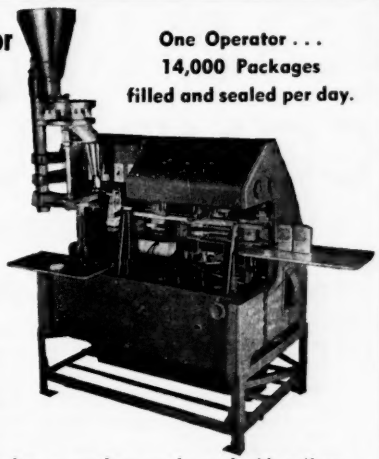

One Operator . . .
14,000 Packages
filled and sealed per day.

Niagara's Model 200 fills a needed gap in the packaging field by combining three unit operations into one semi-automatic machine. Filling, vibrating and heat sealing are swiftly accomplished by only one operator . . . releasing three or more workers for other tasks. Any prefabricated heat sealing type bag or envelope can be used with uniform, attractive results. With all its cost saving features, Model 200 will pay for itself well *within a year's time!* Send the attached coupon for further information today!

NIAGARA PACKAGING MACHINERY CORP.

★

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Gentlemen:
Please send me further information on Model 200.

Name .....

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We are looking forward
to a visit from you
at

BOOTH 8

during the convention of the
Institute of Food Technologists
July 11th to 14th

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**THE AMERICAN
MAIZE-PRODUCTS COMPANY**

100 East 42nd Street
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PERMAG
COMPOUNDS

a "Tailor-Made" **Cleaning Material**
for the **FOOD CANNING Industry**

This is just one case of many in which **PERMAG** Cleaning Compounds were highly successful. Our Technicians can help you in any cleaning problem. Write or telephone for appointment at no obligation.

THE PROBLEM before a food processing plant with fine new cooking equipment was this: How can we prolong the life of our expensive equipment, cleaning it in a washing machine and reduce the effect of water from artesian wells?

The **FIRST ACTION** they took was—conferring with **PERMAG** Technicians and engineers of the Magnuson Corporation.

The **RESULT** of these interviews was:
1 A new specially made Compound—
2 Better cleaning right from the start.
3 Positive safety in every detail
4 Substantial savings in equipment and satisfaction all around

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How to select and use refrigerating equipment for best service

REFRIGERATING PRINCIPLES AND PRACTICES is a well-rounded guide to help you select the proper refrigerating system for your specific requirements, and to help you get more efficient service from your equipment.

All common applications of refrigeration for the manufacture or preservation of comestibles are explained in detail—in terms of the necessary equipment and the most economical use of that equipment.

Here are numerous tables giving you quick-reference data on temperatures, storage periods, humidity, freezing points, etc., for fruits, vegetables, nuts, dairy products, poultry, fish and meats.

Comparative advantages and disadvantages are charted for the generally-used refrigerants—ammonia, carbon dioxide, the Freons, methyl chloride, sulfur dioxide—indicating odor, toxicity, inflammability, cost, etc.

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**398 pages 6 x 9 95 charts, tables
74 illustrations $4.00**

Here's a book that gives you thorough coverage of refrigeration problems in

—COLD-STORAGE WAREHOUSES
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A sampling of the "dairy refrigeration" breakdowns in this manual shows you how extensive the information is: specific heat of dairy products, market milk plants, creameries, cheese plants, condenseries, milk-powder plants, ice-cream plants, etc.

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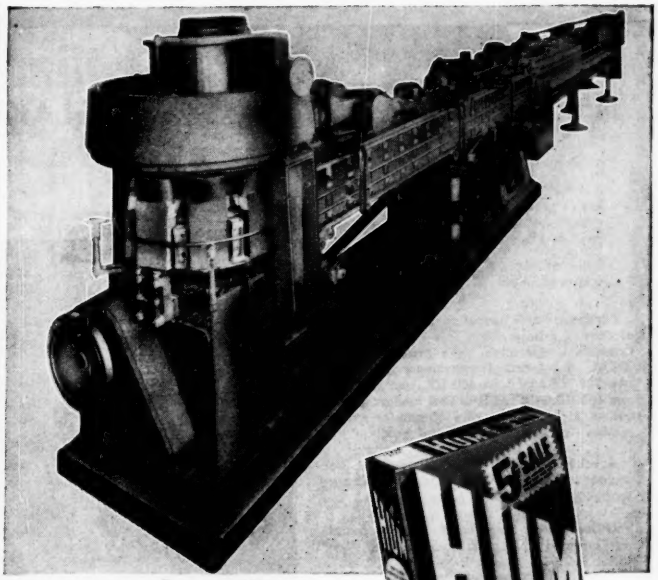

to make things

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S & S NEVERSTOP

Here is yet another satisfied Stokes and Smith customer. Like hundreds of others using S & S equipment, Theobald Industries have found that it pays to have the *best* in production machinery.

NEVERSTOP automatically feeds the cartons . . . bottom seals . . . fills . . . then seals the carton tops. *There is no stopping!* After the cartons are fed into the machine, they move in a smooth never-ending line, rapidly to completion and packing. NEVERSTOP is built in 3 models and will fill up to 160 or more units per minute.

For nearly 50 years, Stokes and Smith have been recognized as builders of "Better Machines for Better Packaging". If your products require wrapping, sealing, or filling in bags, boxes, cartons, bottles or cans, there is an S & S machine to do it swiftly, neatly and accurately.

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PACKAGING MACHINERY — PAPER BOX MACHINERY

(A wholly owned)

Subsidiary of Food Machinery and Chemical Corporation

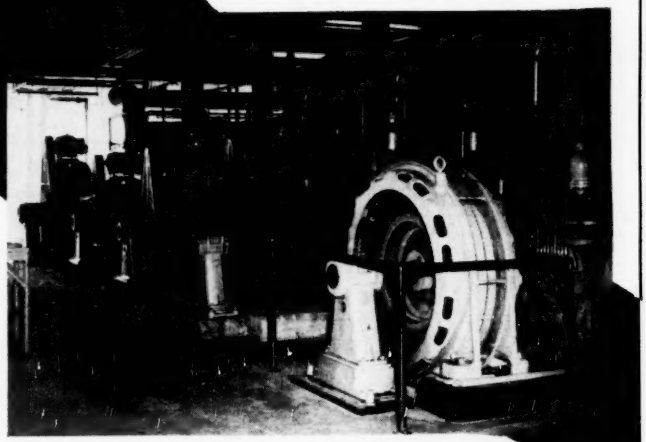
4911 Summerdale Ave., Philadelphia 24, U. S. A.

Exclusive West Coast Distributor

ANDERSON-BARNGROVER DIVISION OF FMC

San Jose 5, California

IT'S **IDEAL** AT LAKE WALES, FLORIDA!



For dependable operation in its processing of canned orange juice, The Florida Citrus Canners Cooperative have installed eight IDEAL low-speed Synchronous Motors—one 700 HP and four 300 HP, one 200 HP, one 150 HP, one 100 HP. This modern plant boasts Ideal Motors, and Majonnier evaporators—a combination of the best!

Another IDEAL 700 HP Motor will be added this year by this progressive cooperative.

Other similar installations will be found at Florence Villa, Fla., and Covina, Ontario, Hollywood, Calif.

Specify IDEAL Motors, Generators, and Switchgear for all heavy duty requirements—specification engineered—built by an organization with 46 years experience manufacturing power apparatus.

THE IDEAL ELECTRIC & MFG. CO., MANSFIELD, OHIO, U. S. A.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

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To figure advance payment count 5 average words as a line.
INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
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BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices, count as one additional line.

DISCOUNT OF 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

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The advertising rate is $9.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

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NEW ADVERTISEMENTS received by 10 A. M. July 21st will appear in the August issue subject to limitations of space available

SALES REPRESENTATIVES WANTED

Manufacturer of efficient high pressure cleaning equipment, est. since 1860, desires sales representatives calling on food processing plants in selected exclusive territories. Company is presently selling to many of the largest food plants although it has not previously had representation in this field. The product has enthusiastic acceptance, proven performance where other equipment has not been satisfactory and original installations have brought many orders for additional equipment.

RW-9138, Food Industries
330 West 42nd Street, New York 18, N. Y.

Nationally known food manufacturer is seeking ASS'T. SALES MGR. who has wide contacts. Unusual opportunity. State age, experience, etc.

SW-9135, Food Industry
330 W. 42nd St., New York 18, N. Y.

Industrial or Methods Engineer

Nationally known food processing company has an opportunity for experienced industrial or methods engineer familiar with canning and freezing processes. Submit complete resume including salary requirements in reply to

P-9260, Food Industries
68 Post St., San Francisco 4, Calif.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

ENGINEER EXPERIENCED in food processing field to take charge engineering department for equipment manufacturing company with national distribution. P-9147, Food Industries.

WE ARE looking for better-than-average food processing equipment salesman to call on national accounts. Attractive proposition with plenty of room to grow. P-9148, Food Industries.

POSITIONS VACANT

WANTED—TECHNICAL Baker—specialist in yeast raised products, to act as development man in eastern baking research and development laboratory. Must be thoroughly familiar with wholesale shop practice and dough handling machinery. Location—N. Y. C. Send resume to P-9197, Food Industries.

FOOD CHEMIST or Technologist—young, with one or two years experience in the milling of cereal field. For product and process development. (Salary $4000.) Location—N. Y. C. Send resume to P-9198, Food Industries.

ANALYTICAL CHEMIST — Thoroughly familiar with food analytical methods; to act as analyst for research laboratory. Location.—N. Y. C. Send resume to P-9199, Food Industries.

Additional Employment Advertising On Opposite Page

Save on Rebuilt Equipment

SPECIALLY PRICED FOR QUICK SALE

UNION Rebuilt Machinery Established 1912

Stokes & Smith Auto Duplex Auger Powder Filler with cap-pressing attachment.

(CRCO) Chisholm-Ryder New Way and Burt Automatic adjustable Wrap-around Can and Jar Labeler, adj. to 1 gal. size.

Colton and F. J. Stockes Late Style Rotary and Model T Tablet Machines.

Groen RA 100 gallon S.S. Steam Jacketed Mixing Kettle, motor driven.

Triangle Package Machinery Models G2C and A60A Electric Pak Fillers.

Standard Knapp No. 429 and J. L. Ferguson Carton Sealers.

Package Machinery FA, FAQ, FA2, Hayssen 3-7 and Miller Auto Wrappers.

Mikro 4TH, 3TH and 1SH, Jay Bee 3TH and U1, Schutz-O'Neill, Stedman Mills.

Baker Perkins and Readco Heavy Duty 100-150 gallon Double Arm Jacketed Mixers with Sigma or Fish Tail Blades.

F. J. Stokes, J. H. Day, New Era, Hottman Mixers, from 2 gallons up to 450 gallons with and without Jackets, Single and Double Arm Agitators.

Day & Robinson 100, 600, 1000, 2400, 4000 lbs. Dry Powder Mixers & Sifters.

3 Rotex, Robinson #31, Schutz-O'Neill #3 Sifters; Gayco 8' Air Separator.

Pony M Labelrite, Ermold and World Semi-Automatic and Fully Automatic Rotary and Straightaway Labelers.

Pneumatic Scale & Resina Auto Cappers.

Horix MRM Stainless Steel Rotary Filler, Elgin 24 Head Rotary Filler, Bagby Twin Piston Filler, Bottom Feed.

Ertel 12 Head Semi Automatic Stainless Steel Vacuum Filler with Sprinkler Heads, etc.

Sparkler, Sweetland, Vallez, Sperry, Shriver and Johnson, Filter Presses.

Ceco Auto Carton Closing Machine.

Filler 1, 4, and 8 head S.S. Piston Fillers.

Huhn, Steam & Gas Fired Rotary Dryers.

Doughboy No. 40 Auto Bag Heat Sealers.

Enterprise, Late Model, 6K, 6 inch motor driven Fruit and Meat Grinder.

MANY OTHER ITEMS OF INTEREST IN STOCK — FULLY GUARANTEED

Write, Phone, Wire Collect for Details and Prices on Your Requirements

Union STANDARD EQUIPMENT CO.
318-322 LAFAYETTE ST., NEW YORK 12, N.Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

POSITIONS VACANT

(Continued from opposite page)

PRODUCTION FOREMAN or Manager wanted for manufacturer of tomato ketchup. Wonderful opportunity for man with thorough working knowledge of manufacturing procedure. P-9275, Food Industries.

FOOD TECHNOLOGIST — salary $8000 to $12000 including expenses to work in England for three to four months developing new products for dehydrated soup manufacturer. Contact immediately. P-9294, Food Industries.

EMPLOYMENT SERVICES

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

FOOD CHEMIST and Technologist, Masters Degree, 7 years experience in all types of foods. Supervised laboratory. Familiar with all specifications for food products. PW-7579, Food Industries.

QUALITY SUPERVISOR—experienced in plant and administrative problems of process cost reduction, quality control, and product development. PW-9261, Food Industries.

FOOD CHEMIST, eight years experience in production and control of soups, marmalades, jellies, sauces, tomato products, wishes to locate in Florida. Presently employed. PW-9256, Food Industries.

SPECIALIST FISH and Shells, packed in cans and jars. Spiced, pickled fish. European style. Quality control and give instruction. Salary $6500. PW 9290, Food Industries.

MANUFACTURERS' REPRESENTATIVE

University degree dairy chemistry. Over 12 yrs. sales & promotional exp. wishes to represent food or other materials mfgr. in N. Y. Metrop. area on exclusive territory comm. basis. Now active wholesale bakery, ice cream and institutional fields.

RA-9109, Food Industries
330 West 42nd St., New York 18, N. Y.

FOR SALE

Complete modern peanut butter, mayonnaise and salad dressing plant. Located in Southeastern peanut belt. Built new in 1946 and special machinery for stabilizing peanut butter added in 1948. Capacity 3,000 lbs. peanut butter per hour or 125 gallons mayonnaise or salad dressing per hour. This is a $100,000 investment for $75,000 or will consider leasing to responsible party.

BO-9194, Food Industries
330 W. 42nd St., N. Y. 18, N. Y.

COURSES IN FOOD TECHNOLOGY

MEN OR WOMEN

Fundamentals and laboratory work in Canning, Freezing, Preserving, Science of Nutrition, Food Analysis, Mold Counting, Menu Planning. Night classes. Veterans paid while learning.

MIAMI SCHOOL
FOR FOOD PROCESSING SPECIALISTS
Box 383, Coral Gables 34, Florida

ANDERSON EXPELLERS

All models, rebuilt for specific materials in our suburban Philadelphia shop—20 years of specialization.

PITTOCK & ASSOCIATES,
Moylan, Pa.

USED ICE PLANT

12 CAN GROUP

Two 45 Ton TANKS with 300 LB.-CANS with ALL handling equipment for immediate Delivery. Complete Plant Only.

DASCO
1307 St. Clair Ave., Cleveland 14, Ohio
Phone Main 6729

SYRUP MANUFACTURER

with national distribution interested in securing packing facilities various sections of United States. In replying, please give us a general description of your plant and an outline of the equipment which you have available.

W-8830, Food Industries
330 West 42nd Street, New York 18, N. Y.

FOR SALE

One Vac-Spray Labeler

25-45 cpm quickly adjustable to all sizes including gallons. Used one month. Cost $2000.00. Make offer.
Three Lightning Mixers practically new.

SILVER SPRING GARDENS, INC.
EAU CLAIRE, WISCONSIN

WANTED

Large engineering firm wishes to acquire several complete food plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible; strictest confidence.

Box 1219, 1474 Broadway, N. Y. 18, N. Y.

BOILERS

3—Scotch-Marine type Boilers, 200 H.P., 125 lb. pressure, A.S.M.E. code.
1—Kewanee Boiler, 125 H.P., 125 lb. pressure, A.S.M.E. code.

R. GELB & SONS, INC.
Union, N. J. Unionville 2-4900
Est. 1886

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TANKS

Stock List Will Be Sent On Request

EMSCO EQUIPMENT COMPANY
Affiliate of Emil A. Schroth
51 Hyatt Avenue Newark 5, N. J.
Phone Mitchell 2-3536

FOR SALE

2—Anco 3' x 6' Chilling Rolls, M. D.
1—Louisville Steam Tube Dryer, 6' x 50'
1—Rotary Vacuum Dryer, 5' x 33'
1—Buffalo 32 x 90" Atmos. Double Drum Dryer, 20 HP AC Motor, s/s hood.
1—#12 Sweetland Filter, 4" centers, iron or copper leaves.
1—8 x 12' Oliver Acid Proof Filter
1—W & P, Size 16 Mixer, unjacketed, 150 gal. working capacity.
8—Baker Perkins Size 15 Mixers, jacketed, 100 gal. working capacity.
8—Day Powder Mixers, up to 2,000#.
3—7500 gal. Steel Kettles, with copper coils, closed Agitated, 10' dia. x 12'6" deep, 15' overall height.
1—2000 gal. Steel, Jacketed Kettle, open top, Agitated, 9' dia. x 7'6" deep.
20—250 gal. Copper, Jacketed Kettles, open top, with stands, 50" dia. x 42" deep.
3—Pkge. Machinery Type F9 Cellophane or Wax Wrapping Machines.
1—Standard Knapp #429 Automatic Gluer-Compression Unit.
1—Stokes & Smith Powder, Filler, M. D.
2—World Rotary Automatic Labelers.
1—York 6" x 6" Refrig. Unit, 20 HP Motor.

CONSOLIDATED PRODUCTS COMPANY, INC.
13-17 Park Row New York 7, N. Y.
Shops: 331 Doremus Ave., Newark 5, N. J.

MEC

ANTICIPATE YOUR NEEDS
IT'S WORTHWHILE
For the FOLLOWING UNITS
NOW AVAILABLE

1—New Pfaudler Stainless Steel Jacketed Agitated Reactor, 150 gallons.
1—New Glasscote 1000 gallon Jacketed Agitated Glass Lined Reactor.
1—Code Welded Type 316 Stainless Steel Jacketed Reactor 1000 gals. with Agitator & Exp. Pf. Motor.
1—Stainless Steel 2500 gallon Vertical Tank with Agitator.
1—Stainless Steel 13,000 gal. Vert. Tanks.
3—Stainless Steel 500 gal. Vertical Tanks.
1—Sperry 42" Wood Plate & Frame Filter Press, Hyd. Closure, 57 Ch., 1¾" Cake.
1—Shriver 12" Lead Plate & Frame Filter Press, 14 Ch., 1" Cake, Cl. Dely.
1—Stokes 30" x 8' Rotary Vacuum Dryer.
3—Fitzmills Model "D" Stainless Steel, 5 H.P. 3 Ph. Exp. Pf. Motors.
18—New 100 gal. Stainless Clad Jacketed Kettles.
1—Stainless Steel Condenser 170 sq. ft.
New Stainless Steel Jack. Kettles, Tanks, Agitators, Conveyor.

We Buy Your Surplus
Send for Bulletin A-22

THE MACHINERY & EQUIPMENT CORP.
533 West Broadway
New York 12, N.Y. GRamercy 5-6680

FOR SALE
EVAPORATOR—IN NEW CONDITION

Double effect Mojonnier Tubular Evaporator. Continuous operation for producing Condensed Milk—Ice Cream Mix. Never used in manufacturing. Also suitable for condensing other liquids.

Write HERSHEY CREAMERY CO., Box 121 Harrisburg, Pennsylvania

FOR SALE
ANSTICE HEAVY DUTY DICER

Complete with motor and dicing attachments. Recently reconditioned and guaranteed in perfect working order. A bargain at $450.00. Full particulars upon request.

TAYLOR'S TROPICAL SWEETS
Davenport Florida

BUY BRILL

1—National Packaging 2-station Filler.
2—Stokes & Smith Model G-1 Fillers.
1—Knapp #429 Top and Bottom Gluer.
20—Day, Robinson Powder Mixers, 100 to 3000 Lbs.
5—Mikro Pulverizers, 1SH, 2TH, 2DH, 4TH.
2—Kiefer 16-spout Automatic Rotary Vacuum Bottle Fillers.
2—Kiefer Visco Fillers gear and piston.
2—Knapp and Nu-Way Automatic Can Labelers.
3—New Jersey M and ML Pony Labelrites.
4—Ermold, World Semi-automatic Labelers.
15—Stainless Steel Tanks, 50 to 500 gal.
10—Stainless Steel Kettles, 10 to 300 gal.
3—Pfaudler glass-lined, steam jacketed, agitated Kettles, 75, 100, 150 gal.
5—Louisville Steam Tube Dryers 6'x25', 6'x50'.
4—Buflovak Double Drum Dryers 32"x52", 32"x72", 32"x100", 48"x100".
2—Sperry 30" P&F Filter Presses.
2—Shriver 12" P&F Filter Presses.
1—Sweetland #5 Stainless Clad Filter.
3—Sweetland #7 and #2 Filters.
1—Swenson 4'x5' Rotary Vacuum Filter.
1—Bird 18"x26" Monel Continuous Centrifuge.
1—Tolhurst 40" Suspended Centrifugal with monel perforated basket, m.d.
10—Ross 2-truck steam Tray Dryers, 500 sq. ft. drying surface.

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HAND LIFT TRUCKS

	Cap.	W.	L.	H.L.	H.R.	
50 Lewis Shep. WMS 9-48 Rubber Tires, Roller Bearings, Manual Single Stroke, Speedlift.	2000#	25"	48"	9"	11"	$55
2 Lewis Shep. WHF 10-48	5000#	27"	48"	10"	14"	$175
2 Lewis Shep. WHL 11-54 Master Jack-lift: mechanical multistroke, hydraulic release check	5000#	27"	54"	11"	14"	$155
5 Weld Bilt Pallet Hydraulic	4000#	27"	42"	3½"	6½"	$175

All have been reconditioned, are in excellent mechanical condition and may be returned (prepaid) for full credit within one week of receipt if not found satisfactory.

MR. WARNER
LIBERTY PLANERS, INC.
HAMILTON, OHIO

MAHONEY FOR MACHINERY

982 Stuyvesant Av. Union, N. J.

OFFERS

UNUSED 500 gal. Buflovak agit. ket. closed, jack. or unjack. Unusual USED 26" S. S. Perf. Bas. Lead-lined casing centrif. Excell. cond. USED Stokes Rot. Vac. Dryer, completely equip. Ex. cond. Comp. 650 gal. S.S. (⅜" TH). Direct-fired, still cond. rec. etc.

FOR SALE

24"x20" Buflovak Vacuum Drum Dryer.
32"x72" and 36"x120" Double Drum Dryers.
100 to 300 gal. S.S. Mix Tanks, water jkt.
3—200 gal. S.S. Vert. Tanks, insul., agit.
150 gal. Votator (Rapid Heat Exchanger).
40 gal. S.S. Clad, also Alum. Kettles, jkt.
60 & 150 gal. Copper Jacketed Kettles.
100 to 330 gal. Pfaudler Tanks, water jkt., agit.
2000 & 3000 gal. Pfaudler Tanks, agit.
Hobart Mixer, 3 Speed, 2 H.P.
200 to 1000 gal. Homogenizers or Viscolizers.
12" Bronze Filter, 14 plates with Pump.
3' to 6' S.S., also Copper Vacuum Pans.
Model C 4 "Lightnin" Mixers, ¼ H.P.
Model D4B "Lightnin" Mixer, 3 H.P.
New 1 gal. Laboratory Autoclaves.

LESTER KEHOE MACHINERY Corp.
One East 42nd St. New York 17, N. Y.

FOR SALE

Reactor: 200 gal. Pfaudler jack. agitated.
Dryer: Rotary Vacuum 4x12' Devine.
Dryer: Atmospheric Stokes 4x6' single drum.
Dryers: 2—Davenport 6x30' hot air rotary.
Filter Presses: 7" C.I., 24" wood, 24" C.I.
Dryer: Stokes Vac. Shelf, 10 40x42 shelves.
Pebble Mills: 6x5', 5x4', 4½x5'.
Vacuum Mixer: W. & P. 20 gallon.
Vacuum Pans: 50 gal. and 6' copper.
Pumps: 2 hp. Stain. Steel Centrifugal.
Kettles: Stainless Steel—all sizes. (New).
Centrifugal: Rochester 30" suspended.
Mixer: Day Imperial #30, stainless steel.
Powder Mixers: Burton 20-20, Broughton 5 hp.
Hammer Mill: Prater, 7½ hp. motor.
Mills: 3—roll Day 16x40", rebuilt.

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LOEB EQUIPMENT SUPPLY CO.
1927 W. North Ave. Chicago 23, Ill.

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ADVERTISERS IN THIS ISSUE

Air Express Div. Rwy. Exp. Agcy..... 106
Alan Wood Steel Co. 147
Allegheny Ludlum Steel Corp..... 175
Allis-Chalmers Mfg. Co.....5, 33, 98, 129
Aluminum Co. of America..... 6
Alvey Conveyor Mfg. Co..... 174
American Can Co..... 181
American Gas Association..... 130
American Maize-Products Co..... 202
American Pipe & Construction Co.... 183
Ames Iron Works..... 137
Anchor Hocking Glass Corp.....24-25
Anderson-Barngrover Div., Food Machinery & Chemical Corp..... 139
Arabol Mfg. Co. 166
Armour & Co. 192
Armstrong Cork Co.....103, 107
Atlas Mineral Products Co..... 136

Bahama Food Products Ltd..... 198
Barreco Oil Co. 170
Bausch & Lomb Optical Co..... 28
Bemis Bro. Bag Co..Inserted Between 98-99
Betner Co., Benjamin Co..... 32
Brown Boggs, Fdry & Mach. Co..... 146
Buflovak Equip. Div., Blaw-Knox Co.. 110

Cambridge Wire Cloth Co..... 114
Century Electric Co. 96
Chain Belt Co. 209
Chisholm-Ryder Co. 180
Chrysler Corp. (Dodge Div.)..... 172
Clark Equipment Co. Industrial Truck Div. 116-117
Cleaver-Brooks Co. 171
Crane Co. 97
Creamery Package Mfg. Co..... 132
Croll Reynolds Co. Inc..... 201
Crucible Steel Co. of America..... 27
Cyclone Fence Co. 140

Darnell Corp. Ltd..... 160
Day Co. 150
Diamond Crystal Salt Co..... 177
Dodge & Olcott, Inc..... 201
Drake Hotel 155

Eaton Mfg. Co.....Inserted Between 98-99
Eastern Industries, Inc. 120
Economic Machinery Co.....2nd Cover
Edlaw Co. 125
Entoleter Div. Safety Car Heating & Lighting Co., Inc. 188
Eriez Mfg. Co. 13

Filler Machine Co., Inc..... 192
Findley Co., F. G. 128
Firmenich & Co. 23
Florasynth Laboratories, Inc..... 182
Food Machinery & Chemical Corp..139, 141
Frick Co. 195
Fritzche Brothers, Inc..... 154

Gardner-Denver Co. 91
Gaylord Container Corp.....Third Cover
General Amer. Transp. Corp..... 22
General Biochemicals, Inc..... 198
General Controls 184
General Electric 20-21, 30
Glycerine Producers Assoc..... 189
GMC Truck & Coach Div..... 187
Gottscho, Inc., Adolph..... 168
Grinnell Co., Inc. 15

Hapman Conveyors, Inc..... 138
Hinde & Dauch 152
Hogan, C. T. & Company, Inc..... 8
Huron Milling Co. 177

Ideal Electric & Mfg. Co..... 204
Ingersoll-Rand 191
International Minerals & Chemical Corp. 151
Island Equipment Corp..... 131

Jackson & Church Co..... 148
Jamison Cold Storage Door Co..... 167
Jenkins Bros. 18

Kalamazoo Vegetable Machine Co..... 19
Keasbey & Mattison, Inc..... 169
Kelite Products Inc..... 194
Kennedy Valve Mfg. Co. 124
Kiwi Coders Corp. 198
Klensade Products, Inc. 156
Krim-Ko Co. 133

LaPorte Mat & Mfg. Co..... 168
Lee Metal Products Co., Inc..... 125
Link-Belt Co. 7
Lubriplate Div. Fiske Bros. Refg. Co. 133
Lukens Steel Co. & Div.....16, 193
Lukenweld Div. Luken Steel Co..... 16
Lunkenheimer Co. 108

Magnus, Mabee & Reynard, Inc..... 164
Magnuson Products Corp. 202
Marsh Stencil Machine Co..... 247
Master Electric Co. 17
McGraw-Hill Book Co.....194, 202, 203
McGraw-Hill Catalogs 184
McLaurin-Jones Co. 178
Mears Kane Ofeldt, Inc. 148
Mechanical Mach. & Tool Wks..... 247
Mojonnier Bros. Co..... 149
Monarch Mfg. Works, Inc..... 182
Monsanto Chemical Co. 29
Mundet Cork Corp. 138

Nash Engineering Co. 87
National Can Corp. 210
National Engineering Co. 157
National Starch Products, Inc..... 109
National Truck Leasing System..... 105
Niagara Packaging Machinery Corp.. 201
Nicholson Co., W. H. 154
Norda Essential Oil & Chem. Inc..... 179

Oakite Products Inc..... 190
Omega Machine Co. 136
Orr & Sembower, Inc. 195

Package Machy Co. 115
Paterson Parchment Paper Co..... 145
Peerless Pump Div. Food Machinery & Chemical Corp. 141
Pfaudler Co. 11
Pfizer & Co., Inc., Chas..... 185
Pick Manufacturing Co. 118
Powers Regulator Co. 162

Quaker City Cold Storage..... 207

Reeves Bros. Inc..... 26
Reeves Pulley Co. 155
Republic Steel Corp. 31
Riegel Paper Corp. 12
Rietz Manufacturing Co. 119
Ryerson & Son, J. T. 34

Shepard Niles Crane & Hoist Co..... 123
Snell, Inc., Foster D. 146
Solvay Sales Div., Allied Chem. & Dye Corp. 9
Sprout, Waldron & Co. 122
Standard Brands Inc..... 131
Stephens-Adamson Mfg. Co. Inserted Between 90-91
Sterling Electric Motors 10
Stokes & Smith Co. 203
Sturtevant Mill Co. 134
Sutton, Steel & Steele, Inc..... 186
Sylvania Div., Amer. Viscose Corp.... 163
Syntron Co. 198

Taylor Instrument Co. 196-197
Texas Co. .....Back Cover
Thomsen & Sons Inc., L. C..... 200
Toledo Scale Co. 121
Topflight Tape Co..... 198
Transparent Wrap Machine Corp..... 199
Triangle Package Mach. Co..... 126

Union Bag & Paper Corp..... 161
Union Special Machine Co..... 173
U. S. Automatic Box & Machinery Co. Inc. 14
U. S. Cold Storage..... 140
U. S. Gutta Percha Paint Co..... 127
U. S. Steel Corp..... 104

Van Ameringen-Haebler Inc..... 101
Victor Chemical Works..... 113
Viking Pump Co. 4

Walworth Co. 165
Waterous Co. 184
White Motor Co.....Inserted Between 90-91
Worthington Pump & Machinery Corp. 176

Yarnall-Waring Co..... 158

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PITTSBURGH 22.....Atlantic 4707
7389 Oliver Bldg.

INGREDIENTS FOR THE FOOD PROCESSOR 198
PROFESSIONAL SERVICE..... 200
STORAGE, FROZEN FOODS..... 207

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT
Positions Vacant 204, 205
Selling Opportunities Offered..... 204
Positions Wanted 205
Selling Opportunities Wanted..... 205
SPECIAL SERVICES 205
EDUCATIONAL
Schools 205
BUSINESS OPPORTUNITIES
Offered 205
PROPERTY
For Sale 205
EQUIPMENT
(Used or Surplus New)
For Sale 205-207
WANTED
Equipment 207
Miscellaneous 205

ADVERTISERS INDEX

Allied Equipment Corp..... 207
Brill Equipment Co..... 206
Buckeye Cooperage Co..... 206
Consolidated Products Co., Inc..... 206
Dasco 205
Emasco Equipment Co..... 206
Equipment Finders Bureau..... 207
First Machinery Corp..... 207
Gelb Sons, Inc., R.....205, 207
Hale & Co., Stuart..... 207
Hershey Creamery Co..... 206
Kehoe Machinery Corp., Lester..... 206
Liberty Planers, Inc..... 206
Loeb Equipment Supply Co..... 206
Machinery & Equipment Corp. The..... 206
Mahoney For Machinery..... 206
Miami School for Food Processing Specialists 205
Perry Equipment Corp..... 207
Pittock & Associates..... 205
Savage Bros. Co..... 207
Silver Spring Gardens, Inc..... 205
Taylor's Tropical Sweets..... 206
Union Standard Equipment Co..... 205

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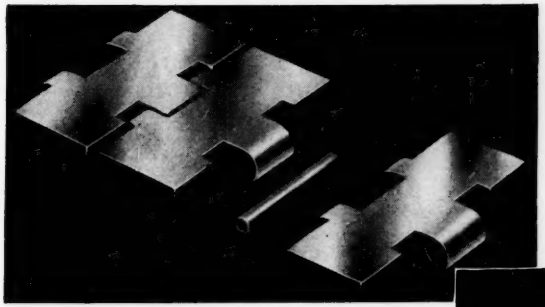
REX TABLETOP Conveyor Chain



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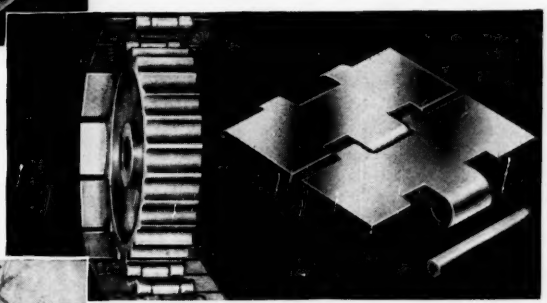
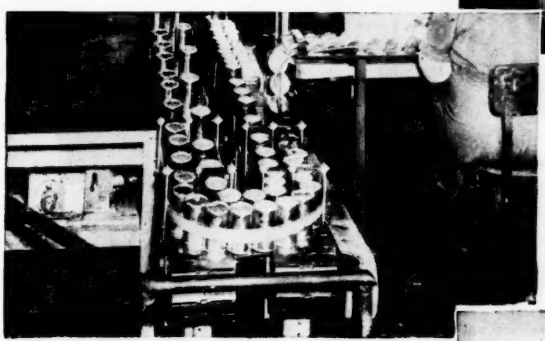


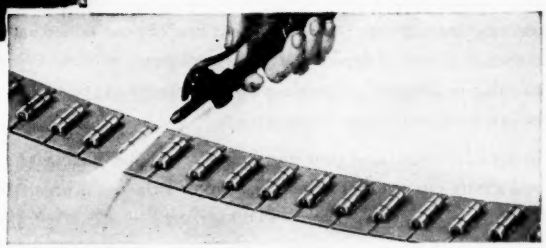
2 *Long Life*

Table Top wears less... load for load, job for job. Note how the entire length of the Table Top joint is engaged by the sprocket teeth. Tooth bearing pressure is spread over the length of the joint. Pin is relieved of load when flexing.



3 *Stops "Jamming" and Tipping*

The Table Top exclusive hinged-joint design provides a continuous carrying surface. There is no gap across the width of the links to catch and trip containers. Table Top slides freely under blocked containers, avoiding pile-ups, spillage and breakage.



4 *Stays Cleaner*

. . . and is easier to clean when necessary. There are no pockets to catch and hold foreign matter . . . surfaces are smooth, edges are fully rounded. Dirt can't accumulate between joint and sprocket tooth. When cleaning is necessary, a jet of steam or water will do the job quickly and easily.

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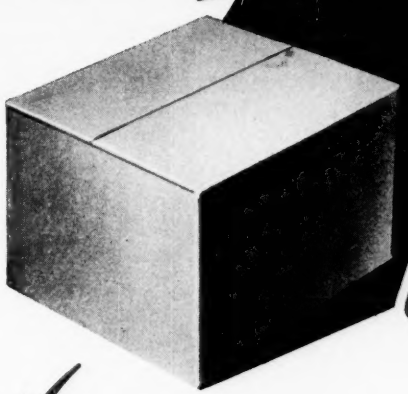

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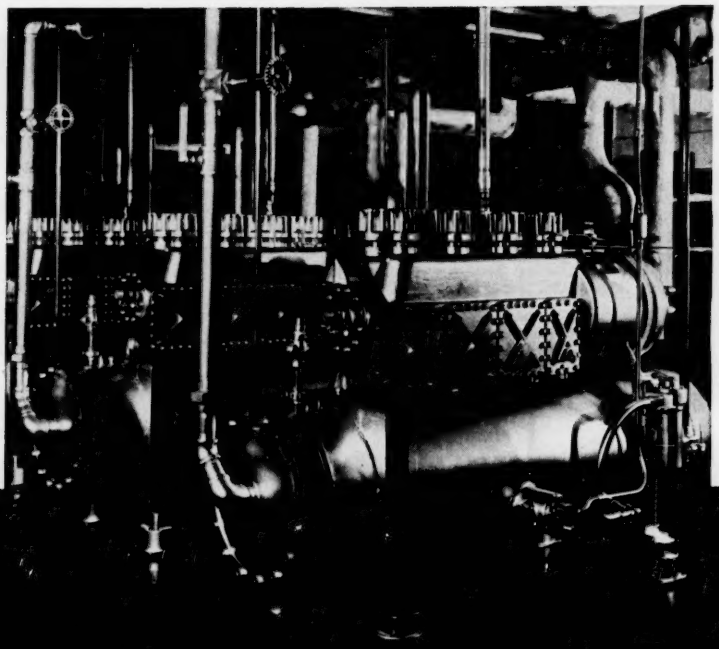
221



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